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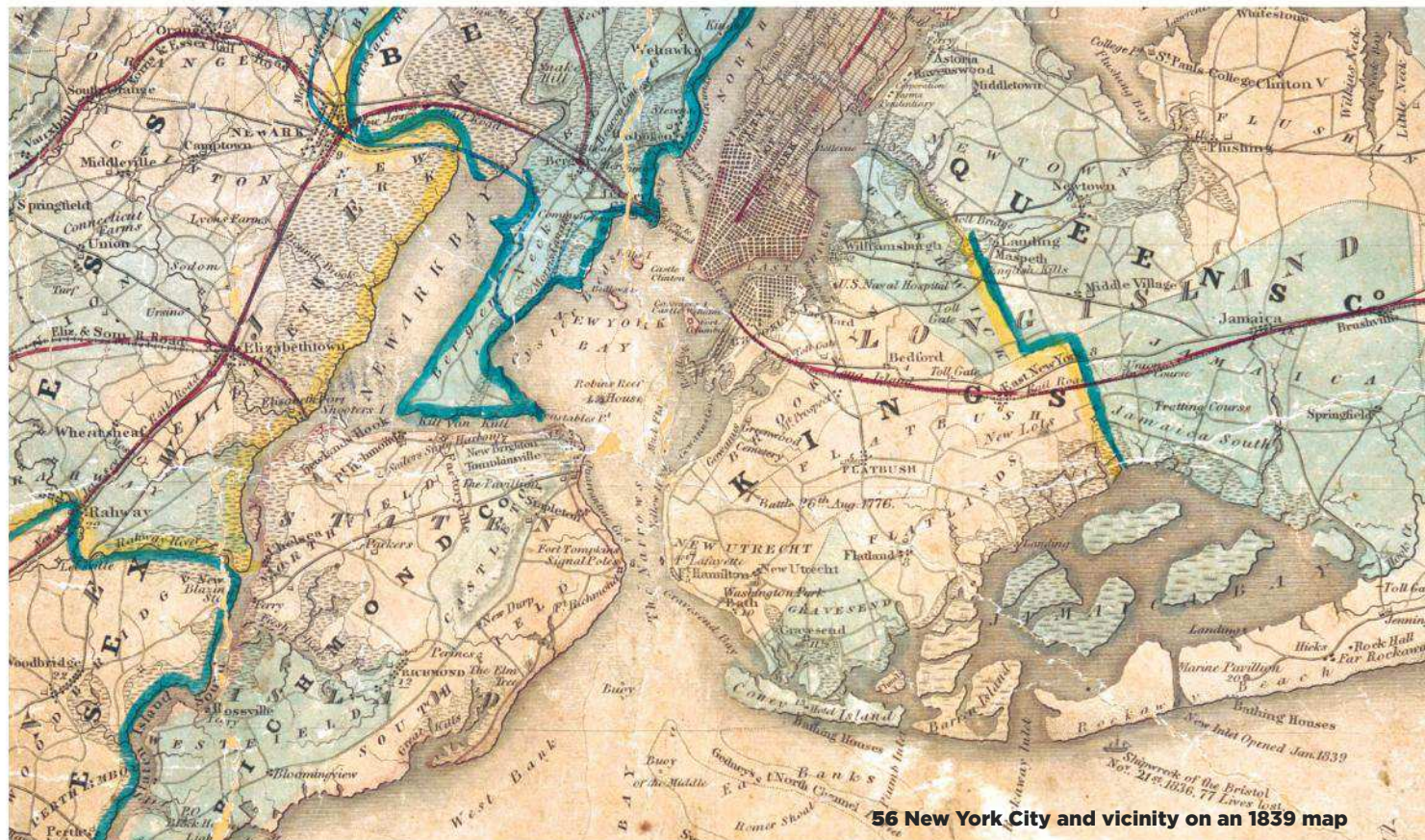
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COVER: One of a series of sphinxes depicting the Middle Kingdom pharaoh Amenemhat III. The statue was seized by the Hyksos ruler Apophis, reinscribed, and probably taken to the capital city of Avaris where it was used to embellish royal temples or palaces. It was later removed to the city of Tanis where it was used for the same purpose by even later pharaohs. PHOTO: DE AGOSTINI PICTURE LIBRARY / A. DAGLI ORTI / BRIDGEMAN IMAGES



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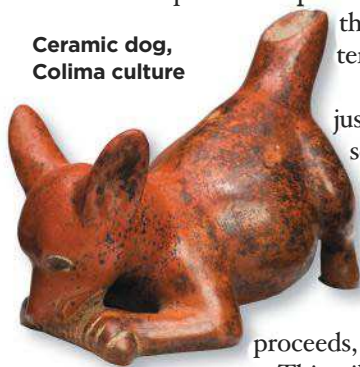
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# BEHIND THE SCENES

Those of our readers who have glanced at this page know that, over my past eight years as editor in chief, my favorite kind of letter is one in which I preview what the next pages hold. The staff here at *ARCHAEOLOGY*—editors Jarrett A. Lobell, Eric A. Powell, Daniel Weiss, and Marley Brown, and creative director Richard Bleiweiss—put their hearts and considerable talents into creating a cornucopia of extraordinary stories. Each piece is intensively researched and beautifully written and art-directed. Each issue delves into the little-known past and explores far-flung places around the globe. In short, this team covers the discipline of archaeology better than any I have ever encountered. And it is all done for you, our readers.

**Ceramic dog,  
Colima culture**



We know that you want to be both entertained and informed, just as we do when we curl up with our favorite publications and scan our favorite websites and Facebook pages, and we set our sights on doing that for you. We also dare to think that you may share our values, ones that, while held quietly, have to do with the importance of cultural and scientific literacy and the protection of archaeological sites around the world. And so, we bring you stories, images, and a sense of how research proceeds, and hope that it will be implicit that it is important.

This will be my last issue of *ARCHAEOLOGY* as editor in chief. As an editor and journalist, it has been a high honor indeed to be able to connect with so many readers who are passionate about the same things we are. I leave you in the excellent hands of the magazine's staff and am pleased and proud to say that executive editor Jarrett A. Lobell will be taking the helm. Jarrett has worn many hats over the years at *ARCHAEOLOGY*. She is a trained archaeologist and, before she arrived here, worked at archaeological sites in many parts of the world. I congratulate her and know that she and the magazine's staff will continue to grow and evolve in the coming years—just as the discipline of archaeology surely will. The ways of discovering and determining what archaeological evidence can yield will grow increasingly subtle as time moves forward, and *ARCHAEOLOGY* is well prepared to cover it.

To you, dear readers, I say thank you for the enthusiasm with which you receive each issue. I bid you all a fond farewell and intend to join your ranks as a loyal subscriber!

*Claudia Valentino*

**Claudia Valentino**  
*Editor in Chief*

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Jeff Posner  
PRI Communications Inc.  
Jeff@pricommunicationsinc.com  
516-594-2820 x11  
**Circulation Consultant**  
Greg Wolfe, Circulation Specialists, Inc.  
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Malin Grunberg Banyasz  
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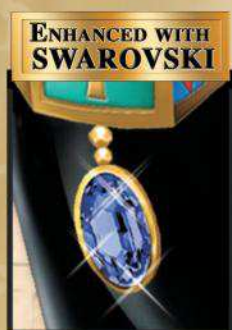
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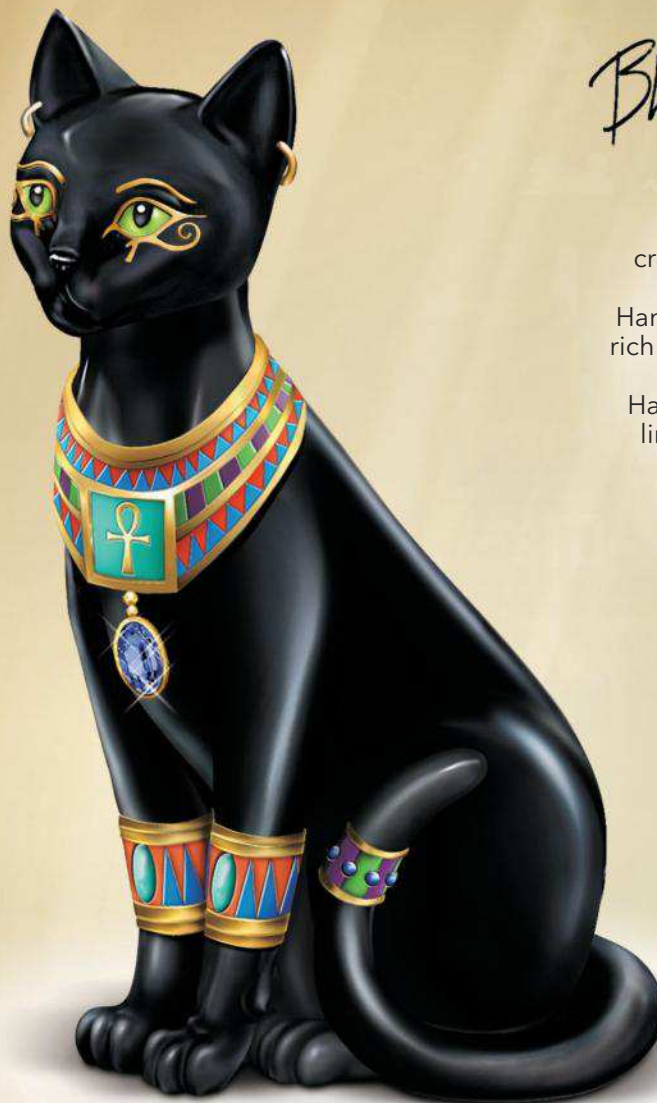
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# LESSONS FROM THE PAST

The Archaeological Institute of America (AIA) devotes considerable resources to its mission of educating the public, including publishing *ARCHAEOLOGY*. I love teaching, even though my career goal was to become an archaeologist, not an educator. In fact, upon returning last year from sabbatical, I realized just how much I missed being in the classroom. When I was young, my mother wanted me to become a high school teacher, as she was, and I did end up following in her footsteps. Teaching at a college or university is one of the few career options open to archaeologists in the United States. I consider myself fortunate to have secured such a position.

Often I am asked if I teach mostly graduate students. Although my department has a Ph.D. program, the overwhelming majority of the students in my classes are undergraduates. In spring 2018, for example, I offered an introductory survey course called New Testament Archaeology to 300 undergraduates. Nearly all of them took the class to



First-century A.D.  
synagogue, Magdala, Israel

fulfill a general education requirement, not because they are majoring in archaeology or a related field. For many of these students, this is their first exposure to the ancient world, as archaeology is not typically offered in high schools, and K-12 curricula focus largely on the present.

Imagine leading a packed auditorium on a voyage of discovery to the past. Sometimes an aha moment draws a collective gasp from the class, as, for example, when students learn that our alphabet, including the word “alphabet” itself, comes from the Phoenicians by way of the Greeks. Or when they realize that the first conservative Republicans lived in Italy two millennia ago. Or when they discover that the word “agora” originally denoted a Greek marketplace, not the campus dining room where they eat lunch.

As we journey through the ancient world, students learn one of the most important skills offered by a liberal arts education: critical thinking. In these days of “fake news,” the ability to evaluate the validity of information and the credibility of sources is more relevant than ever. As I taught my New Testament Archaeology class, we discussed widely publicized reports alleging the discovery of the tomb of Jesus and his family in Jerusalem—the so-called Talpiyot Tomb—which was the subject of a Discovery Channel documentary. This provided my students with an excellent opportunity to hone their critical thinking skills.

Classes like mine are offered at academic institutions throughout North America, introducing young people to a world they may not have known existed. Similarly, *ARCHAEOLOGY* helps to fulfill the AIA’s mission to educate and inform the public about the ancient past.

*Jodi Magness*

**Jodi Magness**

*President, Archaeological Institute of America*

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## FROM OUR READERS

## A DIFFERENT STORY

I enjoyed "Haiti's Royal Past" (July/August 2018) very much. I traveled to Haiti in 2013 to teach a short youth art education program. It is wonderful to see an article that is not about the perceived wisdom of it as a degraded or pitiful place. Beyond this, I enjoyed how well the story was researched and structured, and also the full picture of the people and events in Haiti, and Haitians' relationship to the rest of the world at that time. Good on you!

*Lindsay Wilcox  
San Luis Obispo, CA*

## FARMING THE DESERT

My congratulations to Sara Toth Stub for her excellent article about the Byzantine village in Israel ("Cultivating an Arid Landscape") in the May/June 2018 issue. It was impressive how these people coaxed the environment of the Negev Desert into good food production—under the usual climate conditions. Toth Stub states that the village began to suffer dramatically around A.D. 550 and speculates that a weather change may have played a part. Yes, indeed. A

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pair of cataclysmic volcanic eruptions in 535 and then in 539 created a couple of decades of intense cold and drought for most of the world. The first was at a northern latitude, and the second at a tropical latitude, probably Ilopango in El Salvador.

*Payson Sheets  
Boulder, CO*

## ARCHAEOLOGY AND HISTORY

I am writing to say how happy I am to see the article "One Grain at a Time" published in this magazine (May/June 2018). It is so easy to forget how archaeology can shape cultural identities and national histories of millions of people, in this case in the Philippines. In general it seems archaeology is frequently associated with learning about classical civilizations or lost people. This article's discussion of decolonization through archaeology is a welcome reminder of its relevance in today's world. The inclusion of this article reaffirms my belief in this magazine as the best general archaeology publication on the market. Keep up the great work!

*John Sheffer  
Bow, NH*

## HAPPY MEMORIES

In the early 1990s I was visiting my dad in La Pine, Oregon, and he took me to the cave at Fort Rock ("Off the Grid," May/June 2018). It was sprinkling that

day and we stood near the entrance of the cave and saw shards of obsidian being exposed in the dust from the light rain. We then fantasized about the native people sitting right there, making points to spear fish with, as we could see where the prehistoric lake had been right out in front of us. It was awesome. Wonderful place.

*Lillian Schultz  
Carmichael, CA*

## WHAT MAKES A CITY?

I thoroughly enjoy ARCHAEOLOGY and look forward to each and every issue. I am an archaeologist, now retired, who spent many years working in the Maya area, principally the Northern Maya Lowlands. I found Lizzie Wade's article on Nixtun Ch'ich' ("The City at the Beginning of the World," July/August 2018) quite thought-provoking as I have always been interested in settlement patterns.

The grid-like central planning of the site is truly unique, and, at such an early date, remarkable. Wade's discussion of the various hypotheses and debates was a balanced presentation. A cautionary note: The terms "urban" and "city" when applied to this relatively small site bother me. Until more work is done on Middle Formative sites all over the Maya area, I suggest we not jump the gun on calling this site a true city.

*David Vlcek  
Pinedale, WY*



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# FROM THE TRENCHES

LATE-BREAKING NEWS AND NOTES FROM THE WORLD OF ARCHAEOLOGY

## ICE AGE NECROPOLIS

In the Upper Paleolithic period, just over 12,000 years ago, Arene Candide in Italy's northwestern Liguria region was an imposing cave with a massive, nearly 300-foot sand dune next to its entrance. Today, the dune has been quarried away. For archaeologist Vitale Sparacello of the University of Bordeaux, Arene Candide is key to understanding humanity's legacy in the region. Sparacello grew up in Genoa, just about an hour east of Arene Candide, and has long been fascinated by the deep history the region has to offer. Unlike other caves, which have been studied mostly to see how people lived in them, for Sparacello and his colleagues, the site provides something else altogether—insight into how Paleolithic people buried their dead.

Arene Candide has 10 primary Paleolithic burials, two of which are double burials, and seven clusters of bones, totaling at least 20 individuals. There is a single burial, some 10,000 years older at the site, nicknamed the “young prince.” Piecing together the story of Arene Candide has not been easy. Working with the Italian Ministry of Cultural Heritage in Liguria, the Ligurian Archaeological Museum, the Archaeological Museum of Finale, and the Museum of Anthropology and Ethnology in Florence, Sparacello combed through both the collections of human remains removed from the cave and the museums' archives, in addition to participating in fieldwork at the site over several years, to illuminate what happened at the site during the Upper Paleolithic. “You always wish earlier excavations had done more, taken more notes, more photographs,”

Sparacello says. “But it is humbling to see how much good work they did, especially when you go back to the field and realize that you are responsible for documenting your own generation's excavations.”

The upper, most recent, levels of Arene Candide were first excavated in the 1880s and were found to contain several Neolithic burials dating to 5000–4300 B.C. Six decades later, in the 1940s, archaeologists dug through the site's middle layers and uncovered the Paleolithic individuals, dating to more than 12,000 years ago. They were interred beneath a thick rocky layer in the cave that separated the older from the younger strata. These researchers described Arene Candide as a necropolis, based on the plethora of Neolithic burials. More recently, Sparacello and his colleagues have been able to take that description even further, concluding that Arene Candide was a place that Upper Paleolithic hunter-gatherers visited time and time again in order to inter their dead. They did this for more than 500 years, nearly 20 generations.

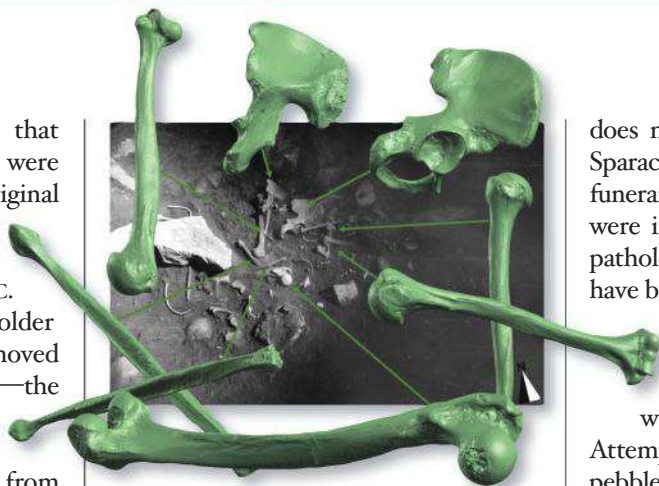
Arene Candide, 1940s



## FROM THE TRENCHES

Sparacello's research suggests that some of Arene Candide's burials were intentionally moved from their original context. This happened in two distinct phases, separated by only a few centuries (10,820–10,420 B.C. and 10,030–9180 B.C.) But the older burials were not just haphazardly moved aside to make room for new bodies—the bones from the earlier burials were incorporated into the newer ones. Crania and other skeletal elements from the older burials were also integrated into the arrangement of stones that encircled the more recent examples.

Moreover, two individuals from differ-



**Skeletal remains and 3-D images, Arene Candide**

ent periods share skeletal anomalies, possibly related to congenital rickets. "This

does not appear to be a coincidence," Sparacello says. "People performing this funerary behavior knew whose bones were involved. We suggest that shared pathologies, especially congenital, may have been the focus of Paleolithic funerary behavior, particularly when it involved multiple individuals."

In addition, small, broken stones were found near the burial circles. Attempts to rejoin the halves of the pebbles have not been successful, leading researchers to propose that half a pebble was left with the dead while the other half was carried away as a talisman or souvenir.

—LYDIA PYNE

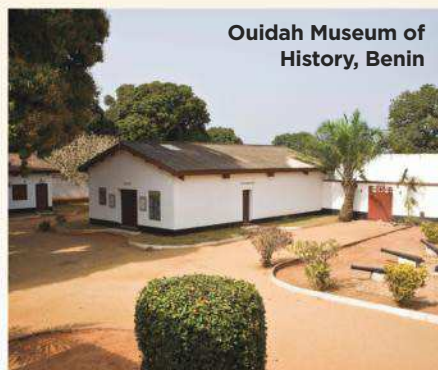
## OFF THE GRID OUIDAH, REPUBLIC OF BENIN

A two-mile-long dirt road through Benin's coastal town of Ouidah leads to the Door of No Return, a monument to some one million enslaved people forced there onto boats bound for European colonies in North America, South America, and the Caribbean. It runs the short distance from the market square, where slaves were sold, to the Atlantic Ocean, where the Middle Passage began. When Europeans first arrived in the late fifteenth century, Ouidah—then known as Gléwé—was the port of the local Hueda Kingdom, which gives the modern town its name. Early explorers and missionaries were soon joined by traders, who established forts and began purchasing slaves from Hueda rulers. By the end of the seventeenth century, some 10,000 enslaved individuals left Ouidah every year. The town was one of the busiest hubs in the maritime world.

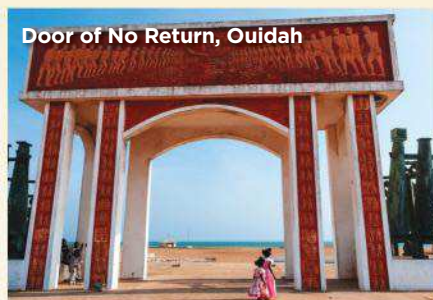
Ouidah also became a nexus for goods and cultural practices from Europe all the way to the Indian Ocean. This *mélange* of influences grew into new traditions, too, such as syncretic forms of Vodun, or Voodoo, of which Ouidah remains a major center. The neighboring Dahomey Kingdom invaded in 1727 and, apart from a period of French colonial rule in the twentieth century, the town has remained part of Dahomey, now the Republic of Benin. Ouidah today is not only a pilgrimage site for devotees of Vodun and a powerful memorial to Africans taken from their homelands, but also a celebration of diaspora communities formed by their descendants around the world.

### THE SITE

Begin at the Ouidah Museum of History, housed in a Portuguese fort built in 1721. Exhibits interpret the lives of Huedans before European arrival, provide an overview of the transatlantic slave trade, and display archaeological artifacts recovered in the area.



**Ouidah Museum of History, Benin**



Visitors should then walk or take a taxi to the Sacred Forest of Kpassè Zoun, a park devoted to Vodun deities said to contain the remains of King Kpassè, founder of Ouidah. End your tour at the Door of No Return on Ouidah Beach, where large middens full of broken clay pipes, wine bottles, and ceramics abandoned by traders can still be seen. "The middens might be the most poi-

gnant reminders of the slave trade visible in Ouidah," says Neil Norman, an archaeologist at the College of William and Mary who has conducted extensive excavations in the area. "They represent just a tiny fraction of material that was imported so human beings could go the other way."

### WHILE YOU'RE THERE

Hire a car to take you 45 minutes down the coast to the region's big city, Cotonou, which also is a good place to stay. While there, explore the Dantokpa Market, which is said to be the largest open-air market in West Africa. You can then hit the beach or visit the Fondation Zinsou, a museum and cultural foundation established in 2005 that specializes in contemporary African art.

—MARLEY BROWN



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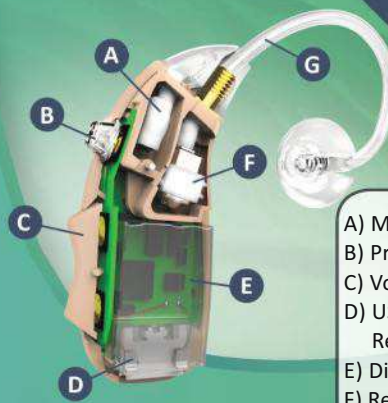


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# HELLENISTIC HELMET SAFETY



An example of an intact Corinthian helmet, from the 6th century B.C.



Warrior burial, Taman Peninsula, Russia

Archaeologists have discovered a bronze Corinthian helmet in the burial of several fifth-century B.C. Greek warriors in southwestern Russia. This type of helmet, which completely covers the head and neck, is depicted on iconic statues of such figures as the Athenian statesman Pericles and the goddess Athena, but is rarely found during modern excavations. The recently unearthed example was uncovered at a necropolis on the Taman Peninsula, which, together with parts of Crimea, formed the territory of the Bosphoran Kingdom, a Greek state that was founded around 480 B.C.

In addition to the helmet, the burial also included the men's weapons, as well as an amphora and other ceramics. Bridled horses were interred nearby, suggesting that the warriors may have been cavalrymen. Roman Mimokhod of the Russian Academy of Sciences, who leads the excavations at the site, speculates that the warriors all fell during the same battle, perhaps during a conflict with one of the nearby nomadic tribes. But the men's lives were evidently not completely consumed by warfare. Mimokhod's team found that one of the warriors was buried with his harp.

—ERIC A. POWELL



Bronze Corinthian helmet, Taman Peninsula



Bronze harp, Taman Peninsula



# "Michael: Triumphant Warrior"

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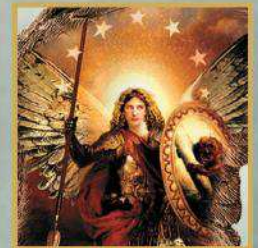
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Howard David Johnson's Renaissance-inspired artwork adorns the Archangel's wings

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## FROM THE TRENCHES

# ALL BUNDLED UP

Archaeologists working at Pachacamac, a pre-Columbian pilgrimage site and ceremonial center on the coast of Peru, have uncovered a well-preserved mummy buried sometime between A.D. 1000 and 1200. The team discovered the mummy while excavating remains of a structure once devoted to local ancestors. The building appears to have been transformed into a ritual healing facility when the Inca Empire absorbed Pachacamac in the late fifteenth century. “We knew there was an important cemetery beneath the building, which had been continually looted since the Spanish conquest in 1533,” says Peter Eeckhout of the Université libre de Bruxelles, who has directed excavations at the site since 1999. “Finding the burial in such a perfect state is miraculous.” Researchers will soon examine the mummy using medical imaging and 3-D reconstruction technology to determine the individual’s position within the bundle, detect possible diseases or injuries, and discover any grave goods included with the remains.

—MARLEY BROWN



Pachacamac, Peru



Mummy bundle, Pachacamac

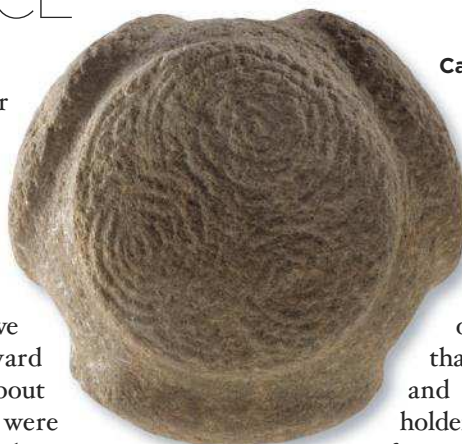


Shell and bead offerings, Pachacamac

# SPHERES OF INFLUENCE

Intricately carved stone balls of unknown purpose, which date to the third millennium B.C. and have been discovered throughout the British Isles—though most frequently in northeast Scotland—continue to beguile scholars. National Museums Scotland houses the greatest number of these objects, and has recently built interactive 3-D models of several using photogrammetry. “In some cases details not apparent to the naked eye are revealed,” explains Hugo Anderson-Whymark, the National Museums Scotland curator who created

the models. “For example, on one ball I identified fine concentric circles that have never been observed before.” Several theories have been put forward over the years about what the balls were for, though Anderson-Whymark believes that those postulating use in battle or in ritual



Carved stone ball

contexts are among the most plausible. “For at least some of these artifacts,” Anderson-Whymark observes, “it’s likely they were deployed as symbolic or ceremonial weapons that indicated the status and authority of their holder.” To see 3-D models of many of these artifacts, go to [archaeology.org/spheres](http://archaeology.org/spheres).

—MARLEY BROWN



# HAND PICKED

Fourth-century bronze head, sphere, and hand from a statue of Constantine, Capitoline Museums, Rome



Testing 3-D model of bronze finger



Bronze finger, Constantine statue



The 1.2-foot-long bronze index finger of a massive fourth-century statue currently on display at Rome's Capitoline Museums, thought to depict the Roman emperor Constantine, has been rediscovered in the Louvre. Aurélia Azéma, now of the French Laboratory for Research on Historical Monuments, made the discovery after studying the finger—which came to Paris from a private collection in 1861 and was originally cataloged by curators as a “Roman toe”—for a doctoral dissertation on ancient bronze techniques. “The finger was an interesting case to illustrate manufacturing techniques, particularly the welding of colossal bronzes,” Azéma says.

Meanwhile, the pieces of the Constantine statue in Rome—

which is thought to have stood nearly 40 feet tall—include an enormous head, a sphere, a left forearm, and a hand missing its palm, and were also important for her research. “In looking at the finger and comparing technological features with those of the Constantine statue, the similarities were everywhere,” she explains, “in size, casting, repairing, welding, and gilding.” The link between the finger and the statue was confirmed beyond all doubt when a team of Azéma's colleagues from the Louvre and the French Center for Research and Restoration of Museums constructed a 3-D model of the finger and brought it to the Capitoline Museums for a fitting. “It was like two pieces of a puzzle,” Azéma says.

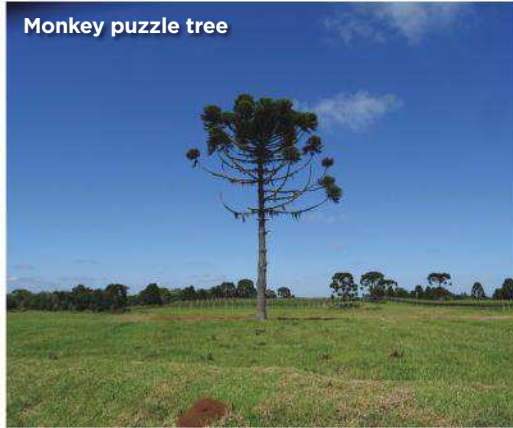
—MARLEY BROWN

## FROM THE TRENCHES

# ANCIENT FORESTERS

When the hardy evergreen trees of the *Araucaria* genus were first shipped from Australia and South America to the gardens of nineteenth-century Europe, they were dubbed “monkey puzzle” trees because of the challenge their needle-like leaves were said to pose to monkeys that attempted to climb them. University of Exeter archaeologist Mark Robinson and a team of ecologists recently discovered that the human relationship with these trees is a long and intimate one, dating back some 1,400 years. By studying carbon isotopes from archaeological sites in southern Brazil, Robinson’s team found that *Araucaria* forests began to expand well beyond their natural habitat at the same time the ancestors of today’s indigenous groups experienced a growth in population. Researchers could

Monkey puzzle tree



isolate no environmental explanation for the expansion, and concluded that ancient forestry practices were most likely responsible for the massive growth of the *Araucaria* forests.

These trees are still a critical source of timber, fuel, and edible seeds for indigenous people and play a central role in their cosmology. “They are often considered to embody ancestors,” says Robinson. Today, because of modern logging, there has been a 95 percent reduction in the range of *Araucaria* species, and most are now endangered.

Robinson notes that since their ancestors played such a critical role in the growth of monkey puzzle forests in the ancient past, native peoples should be permitted to play a larger role in conservation efforts.

—ERIC A. POWELL

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## INDIAN WARRIOR CLASS



Two chariots, Sanauli, India



Mirror and comb, Sanauli

During excavations at Sanauli in the Baghpat district of western Uttar Pradesh, a team from the Archaeological Survey of India (ASI) unearthed the remains of three chariots, along with a number of coffins and other objects they believe are almost 4,000 years old. “The discovery of chariots in burial pits is extremely important, as they put India

on par with ancient civilizations such as Mesopotamia and Greece where chariots were extensively used,” says S.K. Manjul, director of the ASI’s Institute of Archaeology. The three chariots are two-wheeled open vehicles that can be driven by one person. The dig has also unearthed eight burial sites and additional artifacts, including three coffins, swords, daggers, combs, and ornaments. The burial pits indicate that a warrior class thrived in this region, according to Manjul. “These excavations,” he says, “have proved that the chariots, swords, and helmets were used in wars, as they were in Mesopotamia in 2000 B.C.”

—GURVINDER SINGH

## PLEASE WASH YOUR HANDS

A pair of wine barrels that served as latrines in the late 1680s has been excavated in central Copenhagen, offering detailed insights into the diet and cleanliness of those who used them. Employing a range of techniques, including DNA and pollen analysis, archaeologists have identified foods including fish, meats, various grains, cherries, coriander, lettuce, mustard, and hazelnuts. “It’s a varied and quite healthy diet,” says Mette Marie Hald of the National Museum of Denmark. “They were consuming locally sourced products as well as exotic products from a global trading network.”

The imported items include cloves from Indonesia’s Moluccan islands and figs, grapes, and bitter orange or lemon, most likely from the Mediterranean. In order to afford these imported delicacies, Hald says, the people who used these latrines must have been quite wealthy. However, their hygiene could have used some improvement: Varieties of whipworm, roundworm, and tapeworm known to infect



Wine barrel latrines, Copenhagen, Denmark

humans were also found. “They didn’t wash their hands very often, and they didn’t cook their food thoroughly,” says Hald, “and naturally you would get parasites from that.”

—DANIEL WEISS



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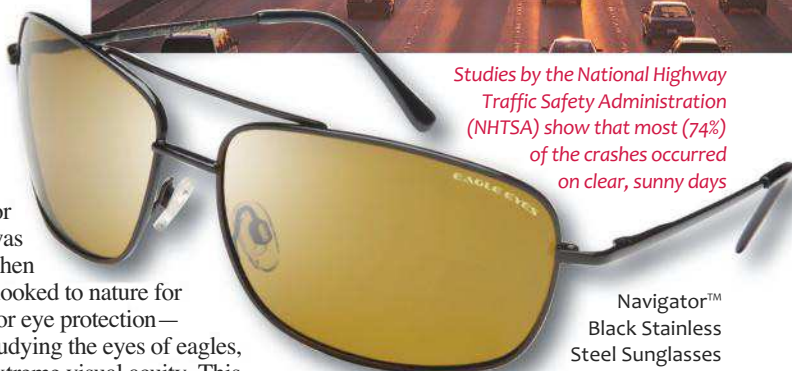
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## FROM THE TRENCHES

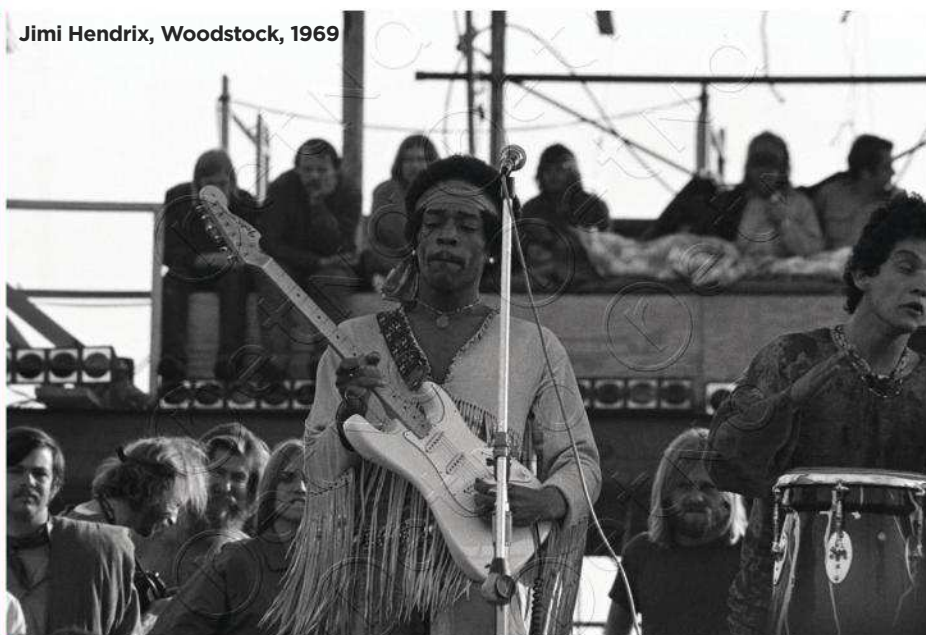
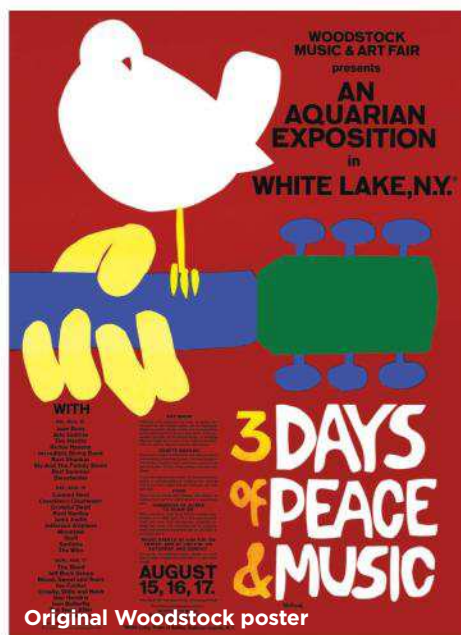
# CAN YOU DIG IT, MAN?

Almost five decades after Woodstock, archaeologists from Binghamton University's Public Archaeology Facility (PAF) are investigating the site of the iconic music festival. Although the grassy hill in Bethel, New York, once accommodated around 400,000 concertgoers, almost nothing remains visible today to indicate that greats such as Janis Joplin, Jimi Hendrix, and the Grateful Dead once played there. The work is a collaboration between the PAF and the Museum at Bethel Woods in anticipation of the festival's fiftieth anniversary celebration in August 2019. "It is the essence of a public archaeology project," says PAF director Nina Versaggi. "Woodstock was a defining moment in the American

experience, and it created a counterculture revolution that changed a whole generation."

The team has successfully identified the area of vendors' booths known as the Bindy Bazaar, as well as the site of the sound and light towers and the "Peace Fence" that once ran parallel to the stage. Versaggi hopes that this new information, coupled with period photographs, will help pinpoint the legendary stage's exact location, which is not known. "Archaeologists are trained to find the ephemeral as well as the amazing," she says, "and the ephemeral traces of Woodstock are pretty amazing."

—JASON URBANUS



Jimi Hendrix, Woodstock, 1969



The stage, Woodstock, 1969



Fieldwork at Woodstock site



# BREAKING THE MOLD



Excavation, Eleutherna, Crete

Researchers at Eleutherna, a fortified city-state in Crete that reached its apogee around 800 B.C., have concluded that a woman whose remains were discovered at the site in 2009 spent her life crafting ceramics. Using a range of technology, including medical imaging and anatomical models, the team, led by anthropologist Anagnostis Agelarakis of Adelphi University, found patterns of skeletal wear consistent with years spent seated and working clay on a kick-wheel-operated turntable, making the woman the only known female master ceramicist in the ancient Greek world. Significantly, Eleutherna has an association with women in positions of importance and power. Four women related to one another and thought to have been priestesses were discovered in ornately furnished burials nearby. “While this is a rare discovery in Greek archaeology,” Agelarakis says, “in some ways it is unsurprising given the importance and privileged social position of the Eleuthernian matriline.”



Female ceramicist remains, Eleutherna

—MARLEY BROWN

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## FROM THE TRENCHES

# A VERY LONG WAY TO EAT RHINO

A new discovery on the island of Luzon pushes back the arrival of humans in the Philippines from 67,000 years ago to more than 700,000 years ago. An international team of researchers studied 57 stone tools found at the site of Kalinga alongside rhinoceros bones that show evidence of

cut marks made while butchering them. Some of the bones had also been smashed open, suggesting that people were after the nutrient-rich marrow. This discovery supports the suggestion that hominins during the Middle Pleistocene

Stone tool

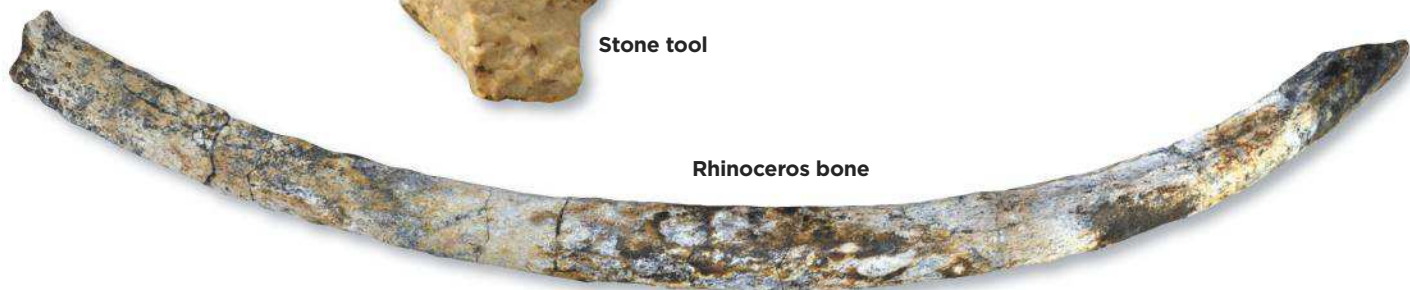


(781,000–126,000 years ago) were able to build watercraft capable of ocean crossings and could navigate the South China Sea to reach Luzon from mainland Asia. At the moment, the researchers are hesitant to pin down which human ancestor may have made the journey, suggesting that it may have been either *Homo erectus* or early members of the recently identified Denisovans who undertook the journey. —ZACH ZORICH

Stone tool



Rhinoceros bone



# HOLD YOUR HORSES

A thin lead curse tablet dating to the fifth century A.D. that was folded and nailed shut to intensify its power has recently been opened, some 80 years after it was discovered beneath the hippodrome in Antioch, in modern-day

Turkey. Curse tablets from the period are generally in Greek or Latin, but this one, although difficult to make out with the naked eye, turns out to have been written in a Jewish dialect of Aramaic using Hebrew lettering. “This means it was written by a Jewish scribe,” says Rivka Elitzur-Leiman of Tel Aviv University, “if not a Jewish magician.”

Working around holes in the text where the nail punched through, Elitzur-Leiman and Margaretha Folmer of Leiden University are now deciphering the tablet’s message with photos taken using reflectance transformation imaging. The tablet’s curse seems to have been aimed at disabling opposing horses in a chariot race. It calls on God and his angels to drown the opponents and on a particular angel, who stood in front of Balaam’s donkey in the Book of Numbers, to block the opponents’ way.

—DANIEL WEISS



Lead curse tablet



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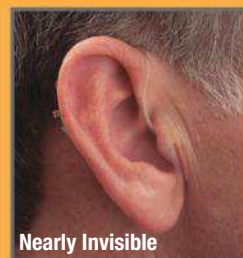
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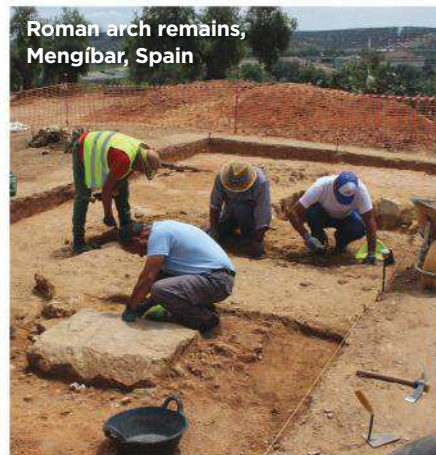
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## FROM THE TRENCHES

### MAKING AN ENTRANCE

Remains of an imposing arch, believed to have been around 25 feet tall and more than 50 feet wide, that marked the starting point of a road in Roman Iberia, have been uncovered near southern Spain's city of Mengibar. According to archaeologist Juan Pedro Bellón of the University of Jaén, the arch of Janus Augustus signaled the beginning of the Hispania Baetica section of the Via Augusta, a nearly 1,000-mile-long road that stretched from the Atlantic through the Pyrenees and connected with routes to Rome. Hispania Baetica, the southernmost Roman province of the

Roman arch remains, Mengibar, Spain



Iberian Peninsula, roughly corresponds to Spain's autonomous community of Andalusia. "We believe that both the Via Augusta and the Janus Augustus arch were part of a transformation of the frontier ordered by the emperor Augustus between 13 and 7 B.C.," Bellón explains. He says that the discovery of the arch will help reconstruct local territorial boundaries that would have been encountered by invading Romans and will provide important new insight into strategic decisions they made when building infrastructure and monumental symbols of Rome's power in the region.

—MARLEY BROWN



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# DO NO HARM

For three days in August of 1862, a small stream called Bull Run near Manassas, Virginia, became the site of one of the most decisive contests of the second year of the Civil War. Just 13 months before, the Battle of First Manassas, also known as the First Battle of Bull Run, had been fought in this same location—but the second engagement was to prove far more deadly. Some 125,000 men were engaged in battle, with 3,021 killed, 15,263 wounded, and an unknown number captured or missing on both sides.

During utility work on the battlefield, archaeologists made a stunning discovery less than a foot below the surface—a surgeon's burial pit filled with 11 amputated limbs and two nearly complete skeletons, the first such pit ever to be excavated and scientifically studied. Isotopic analysis combined with evidence of uniform buttons and Enfield bullets has revealed that the men were Union soldiers from the Northeast, and that they likely died on the final day of the Battle of Second Manassas (or the Second Battle of Bull Run). Further examination of the bones, and in particular the cuts on the amputated limbs, is enabling scientists at the Smithsonian Institution to appreciate the extraordinary skill of the surgeon involved in making and executing potentially lifesaving decisions during the chaos of battle.

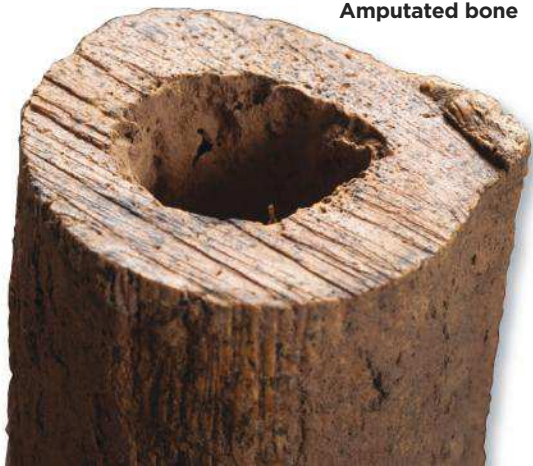
—JARRETT A. LOBELL

Civil War bones at the Smithsonian Institution, Washington, D.C.



Amputated bone

Bone with bullet



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**MONTANA:** Retesting of the only known Clovis period burial has finally resolved a long-standing issue. When the Anzick site was uncovered in 1968, it was found to contain a child's skeleton as well as antler and stone artifacts.

Radiocarbon dating initially indicated that the human bones and the antlers were different ages, causing confusion. Now, a new method of dating that isolated and analyzed specific amino acids has concluded that the Clovis artifacts and the child's remains do indeed date to the same period, around 12,800 years ago.



**GERMANY:** Using advanced imaging technology and ballistics testing, researchers have been able to gain new insight into Neanderthal hunting techniques. The investigation focused on two perforated fallow deer bones, a pelvis and a vertebra, found at the

120,000-year-old site of Neumark-Nord. The results demonstrated that the man-made circular holes were actually caused by close-range thrusting spears, rather than by hurled projectiles. This suggests that Neanderthals were capable of devising sophisticated hunting strategies that allowed them to get up close to their prey.

**ALABAMA:** A carved limestone "medicine tube," originally discovered in the 1930s along the Flint River, presents the earliest evidence of tobacco use in North America. Recent chemical analysis of the 3,500-year-old pipe detected nicotine,

the principal biomarker of tobacco. Tobacco plants were first domesticated in South America

and their introduction to North American native communities was not believed to have occurred until around 2,000 to 3,000 years ago. This new finding indicates that tobacco use was well established before then in what is now the southeastern United States.



**GUATEMALA:** Maya rituals may have literally been weighty affairs for high-ranking rulers. During these festivities, elite officials adorned themselves with an assortment of jade pendants, mostly worn on the ears or around the neck. Heavier ones, such as a 5-pound carved head from Ucanal, were likely attached to a belt, and would have made customary ritual dancing quite cumbersome. It is theorized that the weight of the assembled stones, which may have totaled as much as 25 pounds, symbolized a leader's prestige and responsibilities.



**ITALY:** Today, olive oil is one of the staples of Italian cuisine and it apparently has been for a long time. Chemical analysis of organic residues in ceramic vases found at the Early Bronze Age settlement of Casteluccio in Sicily has revealed that at least three of the jars once held the versatile liquid. The pottery dates to the end of the 3rd millennium B.C., which proves that some ancient Italians were producing olive oil almost 700 years earlier than was previously thought.





**ALBANIA:** Archaeologists confirmed that an area outside of Shkoder, long-believed to be a naturally occurring rock formation, is actually the ruined remnants of an ancient city. The massive walls, measuring 10 feet wide, were constructed between the 4th and 1st centuries B.C. and likely belonged to the lost Illyrian city of Bassania. The Roman historian Livy recorded that Bassania was the scene of intense fighting between Roman soldiers and the last Illyrian king, Gentius, in the 2nd century B.C.



**ISRAEL:** A small faience head from Abel Beth Maacah in northern Israel may represent a king who lived during the 9th century B.C. The sculpture, which sports a manicured beard, wavy tresses, and a painted black and yellow headband, was likely part of a figurine that would have stood about 8 to 10 inches tall. Its high degree of artistry is leading experts to believe it may depict King Ahab of Israel, King Hazael of Aram-Damascus, or King Ethbaal of Tyre, three rulers known from the Bible.



**JAPAN:** Radiocarbon dating of peach pits from the site

of Makimuku in Sakurai has added to speculation that the legendary lost kingdom of Yamataikoku may have been located there. The peaches were ritually buried sometime between A.D. 135 and 230 near a large ancient building, alongside other artifacts. Yamataikoku, which flourished under Queen Himiko in the 2nd and 3rd centuries A.D., is mentioned only in ancient Chinese texts. Scholars have long debated its whereabouts, and Nara Prefecture, where Makimuku is sited, has been considered one possible location.



**ETHIOPIA:** A 3.32-million-year old child's foot from Dikika suggests that *Australopithecus afarensis* children were surprisingly good climbers. Although the female toddler could walk upright, her foot's skeletal structure indicates that she retained some

ape-like traits, such as the ability to grasp objects with her feet. This would have helped *A. afarensis* children cling to their mothers or climb trees, especially when confronting danger. These features are not found in the species' adult skeletons, implying that as individuals grew up and spent more time upright, their bodies changed.



**AUSTRALIA:** Twenty thousand years ago at a campfire in western Australia, it appears that kangaroo was on the menu. Bones from the marsupial were found alongside a thick layer of ash with hundreds of ancient artifacts, including small stone chips from the tools that were perhaps used to carve the meat.

The scene was uncovered by archaeologists inside a cave in Pilbara's Hamersley Range that was used by aboriginal humans during the last ice age and is one of the oldest known sites in the region.



# The Rulers of Foreign Lands

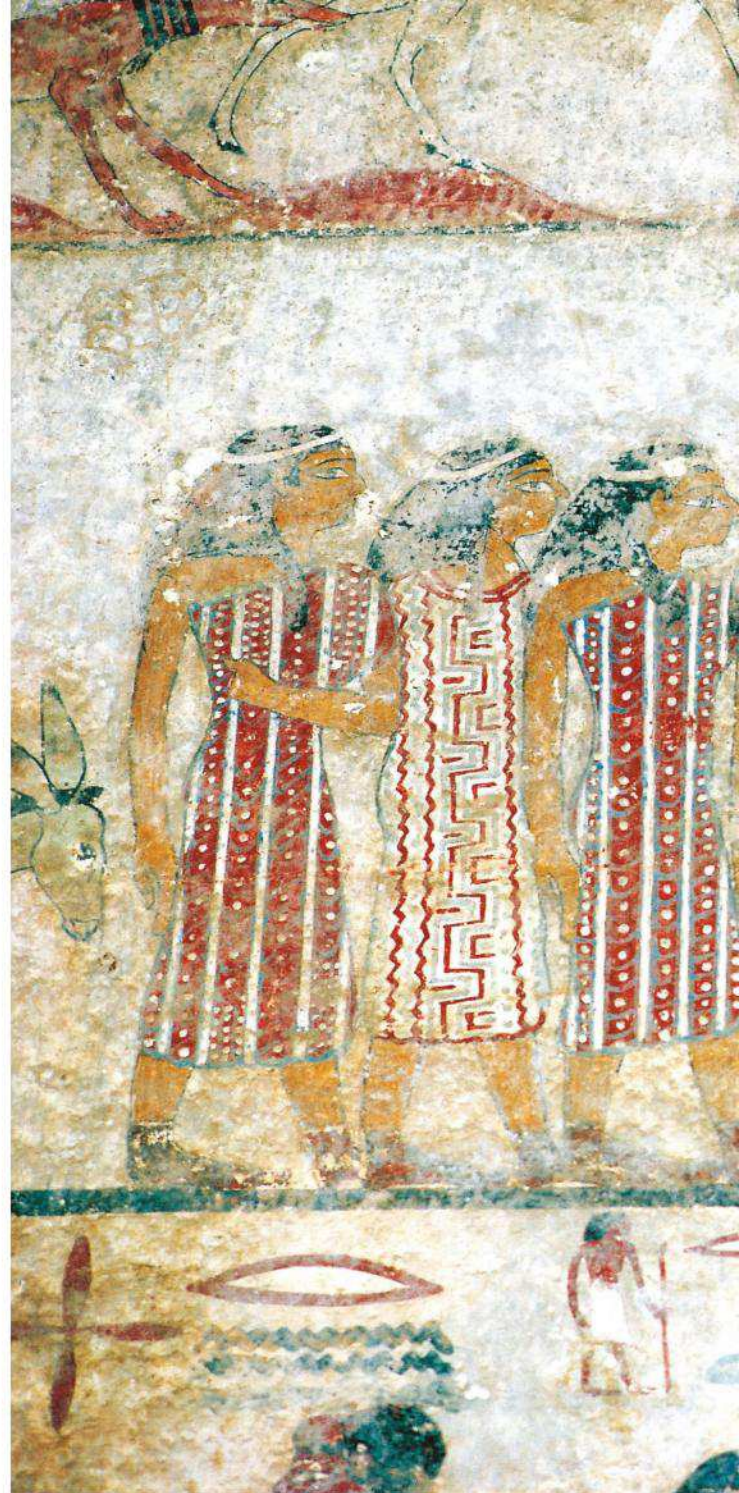
**Was a new regional power, once thought of as a bloodthirsty invading force, actually a catalyst for ancient Egypt's most prosperous era?**

by ANDREW CURRY

**E**GYPT'S CAREFULLY RECORDED lists of rulers run pharaoh after pharaoh for almost 3,000 years. Except, that is, for a century or so around 1640 B.C. when a new group came to dominate the kingdom on the Nile, throwing the region into turmoil and ushering in a new era in Egyptian history.

"For what cause I know not, a blast of the gods smote us; and unexpectedly, from the regions of the East, invaders of obscure race marched in confidence of victory against our land," writes Manetho, a priest and the author of a history of Egypt called *Aegyptiaca* likely written in the third century B.C. Despite the fact that he is describing events at a remove of almost 1,500 years, and although his writings survive only because they are quoted in even later works, such as the first-century A.D. author Josephus' "Against Apion," the account is no less evocative. "By main force, they easily overpowered the rulers of the land; they then burned our cities ruthlessly, razed to the ground the temples of gods, and treated all the natives with a cruel hostility, massacring some and leading into slavery the wives and children of others, and appointing as king one of their number."

When it came to the story of the rise and short-lived rule of these "invaders of obscure race," for centuries scholars took for granted Manetho's account of invasion and disruption as reproduced by Josephus. The tale was supported by other historical accounts, from tables of dynasties, rulers, and reigns found in Egyptian temples to papyrus lists of Egypt's



dynasties. Egyptologists tended to treat the period as a ripple in an otherwise unbroken stream that soon smoothed and vanished, a curious footnote in the three-millennia-long sweep of Egyptian history.

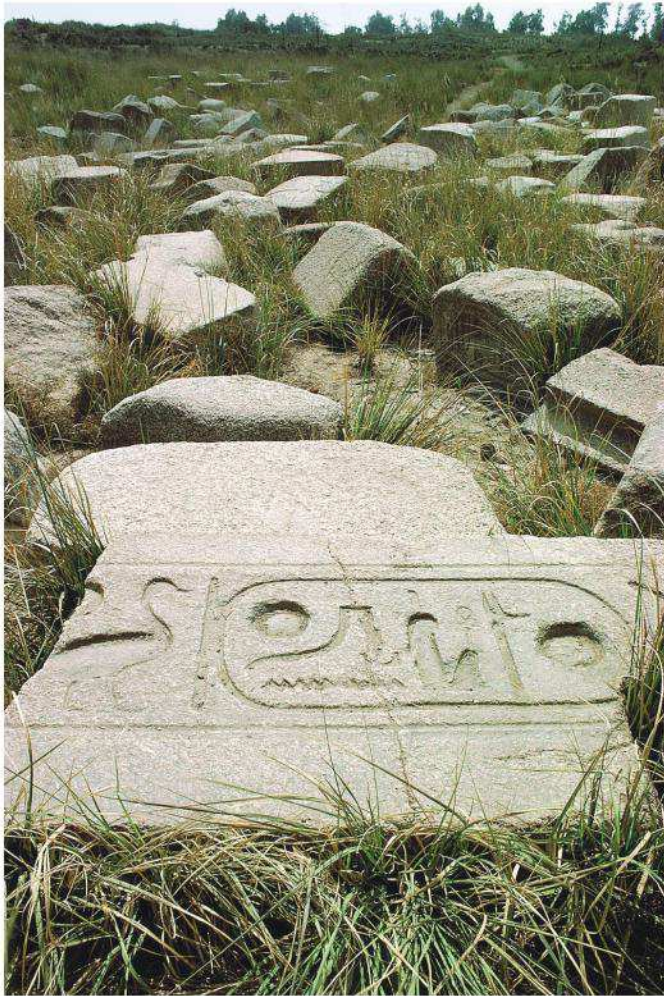
More recently, however, archaeological evidence has shifted the way Egyptologists view these invaders—the Hyksos—and their influence at a pivotal moment. The Hyksos appeared in a chaotic time after the collapse of the so-called Middle Kingdom period but before the blossoming of the New Kingdom, the five centuries of prosperity and territorial expansion familiar to many from the reigns of pharaohs such as Akhenaten and Tutankhamun. New discoveries suggest that





A 12th Dynasty (1801–1802 B.C.) fresco (above) from the tomb of Khnumhotep III in Beni Hassan shows a group of Semitic people, possibly Canaanite merchants, arriving in Egypt. They are thought to be related culturally to the dynasty that called itself the Hyksos. Excavations at Tell el-Dab'a (left) identified the site as Avaris, the Hyksos capital.





An inscribed stone block from Tanis, one of the first sites thought to possibly be Avaris when archaeologists began searching for the Hyksos capital in the 19th century.

these developments may have, at least partially, been a result of this invasion. No longer thought of by some scholars as a brief intrusion, the Hyksos may, instead, have been a force for change, pushing Egyptian civilization forward into a new era.

**H**YKSOS, MEANING “rulers of foreign lands,” stems from the manner in which the short-lived dynasty of Hyksos kings referred to itself. Their origins were unknown, and archaeologists had little to go on apart from scattered historical mentions. The Hyksos rulers seem to have written nothing down.

Egyptian histories refer to a Hyksos capital called Avaris. Egyptologists, tantalized by the possibility of learning what “foreign lands” the storied invaders hailed from, began looking for the city in the 1880s. But none of the sites they identified as possibilities, including nearby Tanis, a large settlement in the Nile Delta, and Pelusium, another Delta site, were a match. Some were too late to line up with the Hyksos period. Others were too small to plausibly be the capital of a dynasty that ruled all of Egypt. In the 1940s, Egyptian archaeologist Labib Habachi began digging on a mound in the Nile Delta

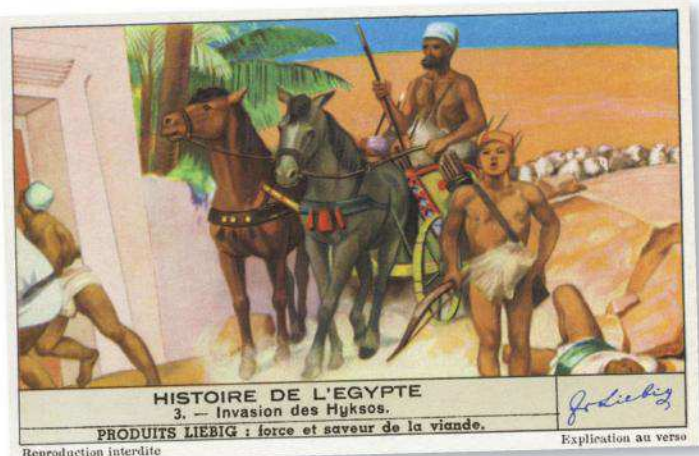
about 40 miles northeast of Cairo called Tell el-Dab’a. Based on his initial finds, Habachi argued the site was a potential match for Avaris.

Later, Tell el-Dab’a proved to be of interest to a young Austrian archaeologist named Manfred Bietak, who started excavating there in 1966. Year after year, he returned to the site, uncovering more and more evidence of a major Egyptian metropolis that had far-ranging connections to the rest of the eastern Mediterranean. He found pottery and weaponry from the Levant and Cyprus, and statues and seals similar to those from what is now Syria. Bietak spent nearly 50 years digging at Tell el-Dab’a, until security problems following the 2011 Arab Spring in Egypt forced the Austrian Archaeological Institute to halt its excavations there.

Today, Bietak is a professor at the University of Vienna and a researcher at the Austrian Academy. He works together with his team to sort through the decades of data from Tell el-Dab’a as part of an ERC Advanced Research Grant called *The Enigma of the Hyksos*. He is not alone in his interest in this period of Egyptian history. Also on board are researchers looking at the impact of the Hyksos on later Egyptian culture, their identity as immigrants, how they came to power, and the reasons for their eventual downfall. Another group headed by bioarchaeologist Holger Schutkowski, based at the University of Bournemouth in the United Kingdom, plans to begin analyzing human remains from around the region and hopes to create a data set that will show where the people of Avaris came from and whether they migrated during their lifetime. What Bietak has found has convinced him that Tell el-Dab’a was, indeed, Avaris—and that the ancient accounts and generations of Egyptologists alike had it wrong.

Rather than a tale of foreign imperialism, Bietak thinks the Hyksos rule was a more homegrown phenomenon, a tale of movement for economic and political reasons that would be familiar today. Immigrants from the Levant, not invaders, briefly elevated fellow immigrants, or perhaps a sympathetic elite from abroad—the Hyksos—to rule over all of Egypt. “The histories say they moved into Egypt by force and were very

**A 1931 trading card from the History of Egypt series by French meat-extract company Liebig depicts the “Invasion of the Hyksos.” The long-held theory that the Hyksos were invaders is now being reevaluated.**





cruel, and led people away into slavery,” says Bietak. “But it wasn’t an invasion. After our excavations, we have no doubt it was a gradual infiltration.” Furthermore, Bietak believes this was done, at least at first, with the cooperation of the pharaohs.

And while Manetho’s bleak account of razed cities and enslaved children paints the Hyksos as a purely destructive force Egypt managed to overcome, evidence from Avaris and elsewhere suggests that they brought important innovations to the kingdom on the Nile, from the horse and chariot to new gods and an openness to the world. “In many ways, the Hyksos period is a groundbreaking period in Egyptian history,” says Kim Ryholt, an Egyptologist at the University of Copenhagen. “It’s the first time you have foreign people with foreign habits ruling in Egypt.”

**U**NDERSTANDING THE HYKSOS phenomenon requires a long view of Egyptian history. The tale, Bietak argues, begins almost 600 years before they took power. Climate records show that around 2200 B.C., the world was gripped by a little ice age. In Egypt, the two centuries that followed were marked by persistent droughts. The prolonged dry spell may have led to political instability that resulted in the fragmentation of ancient Egypt’s Old Kingdom.

But Egypt wasn’t the only place affected by the change in climate. Drought also hit the desert regions to Egypt’s north and west, causing famines that may have spurred migrants from the Levant and the Libyan desert to pick up and head for the relative stability of Egypt’s annual Nilotic floods. This was the beginning of a period of intensive immigration, one the pharaohs tried to control with planned settlements and fortresses. The newcomers probably also brought their own language, which Bietak says was likely a western Semitic tongue related to Canaanite. “From the beginning, the 12th Dynasty [around 1981–1802 B.C.] employed mercenaries from western Asia,” says Bietak. “They moved into Egypt and offered their services to the local ruler in exchange for something to eat.”

Avaris, perched between the Nile’s northernmost tributaries, provided year-round access to the Mediterranean and was perfectly placed to attract these new immigrants. Evidence shows that long before the Hyksos made it their capital, Avaris was a multicultural town that served as one of ancient Egypt’s main military and commercial harbors. Over time, the port city also attracted shipbuilders, sailors, and other immigrants. “It was a local population hub mainly of people from the Levant,” Bietak says. “It blossomed with the blessing of the pharaohs during the late 12th Dynasty. During the 13th Dynasty [1802–1640 B.C.] it became more and more independent.”

Egyptian reliefs from the period depict these new arrivals as an exotic presence. They have mushroom-shaped hairstyles and wield slings and distinctive duckbill-shaped battleaxes, unlike their lance- and shield-wielding Egyptian counterparts. Nevertheless, evidence from Bietak’s excavations suggests that



**A head from a statue of an official dating to the 12th or 13th Dynasty (1802–1640 B.C.) sports the mushroom-shaped hairstyle commonly worn by non-Egyptian immigrants from western Asia such as the Hyksos.**

these immigrants played a central role in shaping the city, including importing pottery styles, ceremonial architecture, dress codes, and non-Egyptian burial customs and religious practices such as interment in the walls of buildings and donkey sacrifices found in tombs and the courtyards of palaces and temples.

Egypt, at this time, was extending its reach to the rest of the eastern Mediterranean. Avaris’ year-round harbor played a key role. Serving as the first port of call for imported trade goods—oils from Cyprus, cedar from the mountains of Lebanon, wine from the Levant—turned Avaris into a boomtown. Cemeteries there dating from the 12th and 13th Dynasties were filled with gold, statuary, and other valuable grave goods, a sign of increasing wealth. Archaeologists have also found evidence of Egyptian influence in other cities around the Near East, perhaps left by trading colonies, embassies, or even political refugees fleeing internal conflicts in Egypt.

The religious landscape of Avaris also provides strong indications of foreign influence. Temples dedicated to storm gods from present-day Syria displaying a distinctive architecture that has little in common with typical Egyptian places of worship were constructed in Avaris beginning around 1800 B.C. For Bietak, it’s clear that the people running the show were from overseas. “The elite decide what kind of temples were constructed, so this shows us where the elite in Avaris come from,” he says. “And this type of temple comes from far, far away.” Meanwhile the city’s population established it as a rival to traditional Egyptian power centers such as Thebes, more than 300 miles to the south along the Nile, and Avaris began attracting people from elsewhere in Egypt. The stage was set for the Hyksos’ ascendance.

**W**HAT EXACTLY HAPPENED next in Avaris is still unclear, but hastily dug mass graves at the site Bietak’s team has excavated suggest that an epidemic swept through the city, perhaps a plague carried aboard one of the many ships that sailed in and out of the harbor. Later Egyptian writers called bubonic plague “the Asiatic disease,” a possible clue that the epidemic may have been introduced by arrivals from the Levant. Bietak’s excavations also show that the local palace burned to the ground toward the end of the 14th Dynasty, around 1640 B.C. It was then that the first Hyksos kings made their appearance in the historical record.

Bietak believes that a small group of foreigners used Avaris and its sympathetic, culturally similar population as a staging ground for a takeover. “There was no conquest, but rather an encroachment and concentration of people from west Asia that had already created a power base for a foreign elite,” Bietak says. From Avaris, the Hyksos rapidly expanded their



**The Hyksos brought with them to Egypt a characteristic type of ax with a duckbill-shaped blade, such as this one found at Avaris.**



rule. For a brief period, in the 15th Dynasty (around 1630–1523 B.C.), the Hyksos dominion stretched to envelop central Egypt. The Hyksos' rise was reflected in Avaris, too. The city's footprint nearly tripled, and at its height, the city was home to an estimated 25,000 people, spread out over a square mile of bustling, crowded, stinking cityscape. (Archaeologists have found neither plumbing nor toilets there.) "It was one of the largest cities in the ancient Near East, not just Egypt," says Irene Forstner-Müller, an Austrian Institute of Archaeology researcher who took over the Tell el-Dab'a excavations in 2009 and used remote sensing to map Avaris' unexcavated stretches. "The size of the town is amazing," says Bietak.

The Hyksos' adversaries in Thebes weren't content with their vassal status for long. The Thebans fought back fiercely, freeing themselves and cutting Avaris off from the rest of Egypt. Fighting between Avaris and Thebes plunged Egypt into a state of civil war. According to contemporary inscriptions and Nubian pottery found in Avaris, the Hyksos seem to have forged an alliance with the Nubians, far to the south in what is now Sudan, in a vain attempt to crush Thebes from two sides. There's even evidence of Hyksos axes in action. Bietak says the skull injuries on the remains of the Theban king Seqenenre, who ruled during the era of conflict with the Hyksos, are consistent with the duckbilled ax blades wielded by Hyksos warriors.

During one of his last excavation seasons, Bietak made a grisly discovery that dates to this violent moment in Egyptian history. In a series of pits dug near the forecourt of a Hyksos-era palace in Avaris, just in front of the throne room, Bietak found 16 severed right hands. He suggests that the amputated appendages were trophies taken by Hyksos soldiers in battle and redeemed later for a cash reward, a tradition their

Egyptian opponents may have adopted as well. Severed hands exchanged for so-called "gold of valor" are a frequent feature on the walls of post-Hyksos Egyptian tombs and victory scenes on temple walls.

**P**ERHAPS SURPRISINGLY, the Hyksos' rise to power was actually the beginning of a long decline for Avaris. Bietak suggests that the city was gradually cut off from the trade networks Egypt offered. Without gold, ivory, and precious woods from Nubia or flint from Upper Egypt, the people of Avaris had nothing to offer their trading partners around the eastern Mediterranean. Eventually, the population grew so desperate they looted elite cemeteries in nearby Memphis. "The Thebans closed the connection between the Hyksos and Sudan. There were none of the coveted commodities from Africa that had put Egypt in a strong commercial position," Bietak says. "That explains why the Hyksos started looting cemeteries."

To Bietak, the archaeological evidence of Avaris' decline provides further proof that the Hyksos were locally based. If they were invaders from the Levant, his reasoning goes, they would have continued to trade with their base back home. Instead, they were soon isolated and grew increasingly impoverished. Project ceramics specialist Sarah Vilain says at this time there was a decline in the amount of imported pottery. As if in response, local potters began producing knockoffs. "You have Levantine shapes with Cypriot decoration, but local materials and craftsmanship," she explains. Even the weaponry used during the Hyksos period was of lower quality. After the city could no longer afford tin imported from the Levant, weapons were made of pure copper, rather than bronze.

In about 1550 B.C., the Theban pharaoh Ahmose (r. 1550–1525 B.C.) launched a campaign to seize Avaris and crush the Hyksos once and for all. Manetho, the same source who had described the Hyksos as invaders, claims Ahmose, the first New Kingdom pharaoh, marched on Avaris at the head of an army 480,000 men strong—yet still failed to take the city. Finally, however, Avaris was captured. According to Manetho, the Hyksos agreed to leave Egypt willingly. According to reliefs celebrating the pharaoh's victory, though, the dynasty's end was bloodier. In Ahmose's temple at Abydos, for example, there are scenes of battles and severed hands. Excavations show Avaris' central palace was burned again. The defeated city never recovered. "Avaris was conquered and partly abandoned by the 18th Dynasty," around 1550 B.C., Bietak says. "Its people were not expelled, but distributed all over the country as slaves and soldiers." Pottery uncovered at Avaris suggests some also stayed behind.

Bietak's analysis of Avaris isn't without controversy. His careful dating of the site is based on evidence including cylinder seals, architectural styles, pottery, and papyrus scraps. But when researchers tested grass seeds preserved at the site using radiocarbon dating techniques, the results were off by nearly a century—a significant gap, given the relatively short reign of the Hyksos kings. Bietak is convinced the radiocarbon dates are incorrect, whether because of the samples that were used, the influence of geography on the site's chemistry, or atmo-



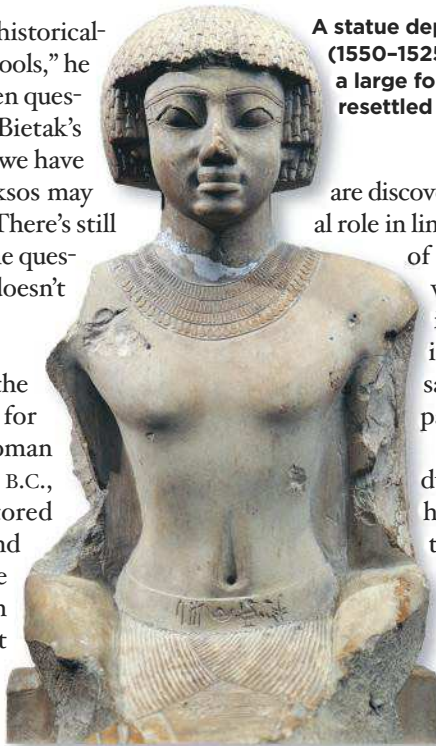
**One of 16 severed right hands unearthed at Avaris provides evidence of a Hyksos military victory.**



spheric changes. “In historical periods, historical-archaeological methods are more reliable tools,” he says. Ryholt says the dating remains an open question, and that not all Egyptologists share Bietak’s confidence. “Since the site is so pivotal, if we have to redate it, palaces we thought were Hyksos may turn out to be pre-Hyksos,” Ryholt says. “There’s still a lot of research to be done, and some of the questions may be difficult to answer. But that doesn’t mean they shouldn’t be asked.”

**C**ENTURIES AFTER their rise and fall, the Hyksos were still a bitter memory for the Egyptians. Hatshepsut, a woman who ruled as pharaoh from 1473 to 1458 B.C., boasted in inscriptions that she restored temples neglected under the Hyksos and reinvigorated disrupted trade routes. “The anti-Hyksos propaganda doesn’t begin immediately,” Forstner-Müller says. “It starts under Hatshepsut, almost 80 years later.” Their names were removed from or left off the king lists that feature in many ancient Egyptian temples. Fifteen centuries later, historians such as Manetho and Josephus still fixated on the episode. “The Hyksos came to represent a trauma for the Egyptians, a trauma so heartfelt the Egyptians were still writing about this in the third century B.C.,” Ryholt says. “It would be interesting to know why.”

And yet, as Bietak and his team continue their work, they



**A statue depicts the 18th Dynasty pharaoh Ahmose (1550–1525 B.C.), who attacked Avaris at the head of a large force. The Hyksos were soon defeated and resettled all across the country.**

are discovering evidence that the Hyksos played a pivotal role in linking Egypt to cultural phenomena in the rest of the Mediterranean and in a number of innovations that came to define Egyptian culture in later periods. “The Hyksos had a lasting influence on Egyptian culture and ideology,” says Anna-Latifa Mourad, a researcher who is part of the Enigma of the Hyksos project.

Some of the changes the Hyksos introduced were obvious and dramatic. The earliest horse skeleton ever found in Egypt belongs to a mare buried within a Hyksos-era palace in Avaris, in a corridor directly behind the throne room. “With the horse comes the iconography of the horse, deities, and technology related to the horse, like the composite bow and the chariot,” says Mourad. “Things we initially assumed to be Egyptian innovations might actually have been inspired by interactions in the Delta.”

Other Hyksos influences were subtler than horses and chariots, but nonetheless reached deep into Egyptian culture, politics, religion, and economics. For example, the Hyksos seem to have introduced long-distance diplomacy. Excavations have uncovered Akkadian seal impressions and a letter in a southern Mesopotamian script. And the temples and gods imported from the Near East to Egypt in the centuries leading up to the Hyksos period did not disappear when the “rulers of foreign lands” were toppled. Mourad says clay seals found at Avaris show that the Hyksos introduced gods such as Baal, a deity common in the Near East. Baal’s attributes were combined with the Egyptian god of the desert, Set. “Baal was chosen for his links to trade, kingship, and the sea,” Mourad says. “The evidence strongly suggests the Hyksos looked at him as a patron deity.”

But more than that, the effort it took to defeat Avaris gave the rest of Egypt a strong push toward a new era of openness and assertiveness. The city’s fall marked the beginning of the New Kingdom, considered the peak of ancient Egyptian prosperity and power. Ryholt suggests that the century of fighting between the Hyksos and people from other parts of Egypt also created a new military culture. Before the Hyksos, Egyptian pharaohs had no standing army. “After two or three generations of war, they developed a hierarchy of soldiers and officers and a standing fleet, chariotry, and infantry,” Ryholt says. Once the Hyksos were defeated, Egypt’s rulers began using their newly acquired military might to launch regular, and often successful, invasions of their neighbors. Says Ryholt, “The Hyksos had a big impact. Indirectly, they laid the foundations for the Egyptian Empire.” ■

Andrew Curry is a contributing editor at *ARCHAEOLOGY*.



**The earliest horse burial in Egypt was excavated at Avaris, evidence of the many innovations the Hyksos brought with them that would have a lasting impact on the course of Egyptian history.**



**A trove of artifacts from an 18th-century coffeehouse, including glass wine bottles, clay pipe fragments, and vessels related to a variety of food and drink, has been uncovered by archaeologists in Cambridge, England.**

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the same period, slight differences distinguish Clapham's as a coffeehouse and are key to understanding its unique place in the community's social life.

The historical record is laden with references to coffeehouses in seventeenth- and eighteenth-century Britain. In 1755's *A Dictionary of the English Language*, Samuel Johnson defined them succinctly as houses "of entertainment where coffee is sold, and the guests are supplied with newspapers." The beverage itself originated on the Arabian Peninsula in the late Middle Ages and spread across the Ottoman Empire to

Europe, arriving in England by the early 1600s. For over 200 years, coffee was almost exclusively consumed in coffeehouses, which reached peak popularity between the late seventeenth and mid-eighteenth centuries.

Coffeehouses of the period are often described as egalitarian spaces where men from various social backgrounds could purchase affordable drinks, read the news, and argue issues of the day. In recent years, however, that view has been challenged as overly simple. Regardless, there has been little consensus about how coffeehouses actually evolved. Most

# A Local Institution

**The cellar of an 18th-century coffeehouse has been unearthed in Cambridge, revealing a dynamic social venue**

by MARLEY BROWN





importantly, there has been scant material evidence of them, so the discovery of Clapham's takes on particular importance. Excavating a site off All Saint's Passage, a narrow lane in Cambridge's historic center that is now part of St. John's College at the University of Cambridge, archaeologists discovered what was once the cellar of Clapham's, revealing the largest archaeological assemblage ever tied to an eighteenth-century English coffeehouse.

**C**LAPHAM'S APPEARS TO HAVE been divided into a series of rooms and likely catered to multiple small parties of customers, most of whom were from the same or a

and was often accompanied by other activities, such as reading newspapers and smoking pipes." When Cessford and his team began digging, they knew right away that they had come across what had been a commercial business, rather than a domestic dwelling. "We found a teapot and then a second and then a third—eventually around 38 teapots—and a great number of other ceramic and glass objects," he reports. "It really looked as if there was more material than soil in the area, which is only about 60 square feet."

The relative number of tea and coffee cups unearthed suggests that tea was the most commonly consumed drink at Clapham's, followed by coffee, and, distantly, hot chocolate.



This late 18th-century engraving based on Samuel Hogarth's ca. 1720 illustration depicts two gentlemen enjoying a quiet moment in a coffeehouse—possibly Button's, in London.

similar class background. It was not, as some establishments were, a large room hosting socially heterogeneous and boisterous crowds. The site shows that some coffeehouses became more private and diverse in style as the eighteenth century wore on, emphasizing food and refinement, rather than stimulants and the prospect of a heated debate.

"While many documents refer to coffeehouses in the eighteenth century, very few give a detailed description of their interiors or the objects used there on a daily basis," says project director Craig Cessford of the Cambridge Archaeological Unit. "This is despite the fact that we know from literary sources that coffee drinking brought with it numerous ancillary goods

The team came across small numbers of the same type of cups, mugs, and glasses, indicating that they were served to small groups of people. "You've got these sets of three or four identical vessels, but no larger groups," Cessford explains, "and that's the same with the material there related to alcohol consumption and eating."

Historian Brian Cowan of McGill University, who has tracked the origins and development of British coffeehouses in the seventeenth and eighteenth centuries, argues that an increased focus on food, particularly higher-end dining, is a hallmark of later eighteenth-century coffeehouses. "There is a lot of discourse about the decline of the coffeehouse in the



The name of Jane Clapham, a proprietor of Clapham's Coffeehouse in Cambridge, can be read on fragments of personalized tin-glazed earthenware plates manufactured sometime between 1746 and 1779.



late eighteenth and nineteenth centuries, but that idea is overblown," he says. "It's really an evolution, not a decline, as coffeehouses gradually took on different dimensions." He believes that, in some ways, eighteenth-century British coffeehouses, especially in central London, were the functional equivalent of the emerging French restaurant of the time—contemporary visual representations and discussions of coffeehouses do seem to focus primarily on eating rather than drinking.

The Clapham's site suggests that dining was indeed an important part of a coffeehouse's business. "We found a large number

of shallow bowls that were likely used for snacks, as well as jelly glasses and bones that may have been boiled to make a delicacy called calf's foot jelly," Cessford says. Plates belonging to two nearby establishments, including a tavern called the Rose, indicate that meals were sometimes ordered in to the coffeehouse from elsewhere. Clapham's can thus be seen as an adaptable watering hole, where regulars could dictate the kind of dining or drinking experience they wanted. "According to the evidence, Clapham's was a rather malleable place," says Cessford, "and perhaps was valued as a middle ground between coffeehouses that did not sell alcohol and larger, often rowdier, inns and taverns." Cowan points out, however, that coffeehouses continued to have a reputation as centers of learning and discussion, and had, especially, an association with print culture.

The team also found evidence of smoking but, according to Cessford, the practice was surprisingly rare. "We only found a small number of pipes, which could be in part due to the habit going out of fashion among the clientele during that period," he says. Cessford surmises that smoking was eschewed in favor of taking snuff, a habit embraced by social elites of the time. This perspective, though, runs counter to pictorial depictions of coffeehouses and their patrons, and to the general consensus among historians that smoking rose along with the popularity of coffee and tea. Interestingly, the dearth of pipes at Clapham's reinforces the idea that regulars belonged, or at least affected to belong, to a social group with established norms of behavior, and, by extension, that the coffeehouse was a place to spend time with like-minded individuals.

The power of the coffeehouse to socially define its patrons, at least to some extent, Cowan argues, is one consistent thread that runs throughout the seventeenth and the eighteenth centuries, and is even applicable in today's age of pour-overs, ethically sourced beans, and laptops. "Modern coffee chains have presented the coffeehouse as a cool, stylish place to go, and coffee has become a sort of social signal for the kind of person you are," he says. "Coffeehouses were doing that in the seventeenth and the eighteenth centuries as well. The idea of promoting the coffeehouse as a projection of your self-image is certainly a constant." ■

Marley Brown is associate editor at *ARCHAEOLOGY*.

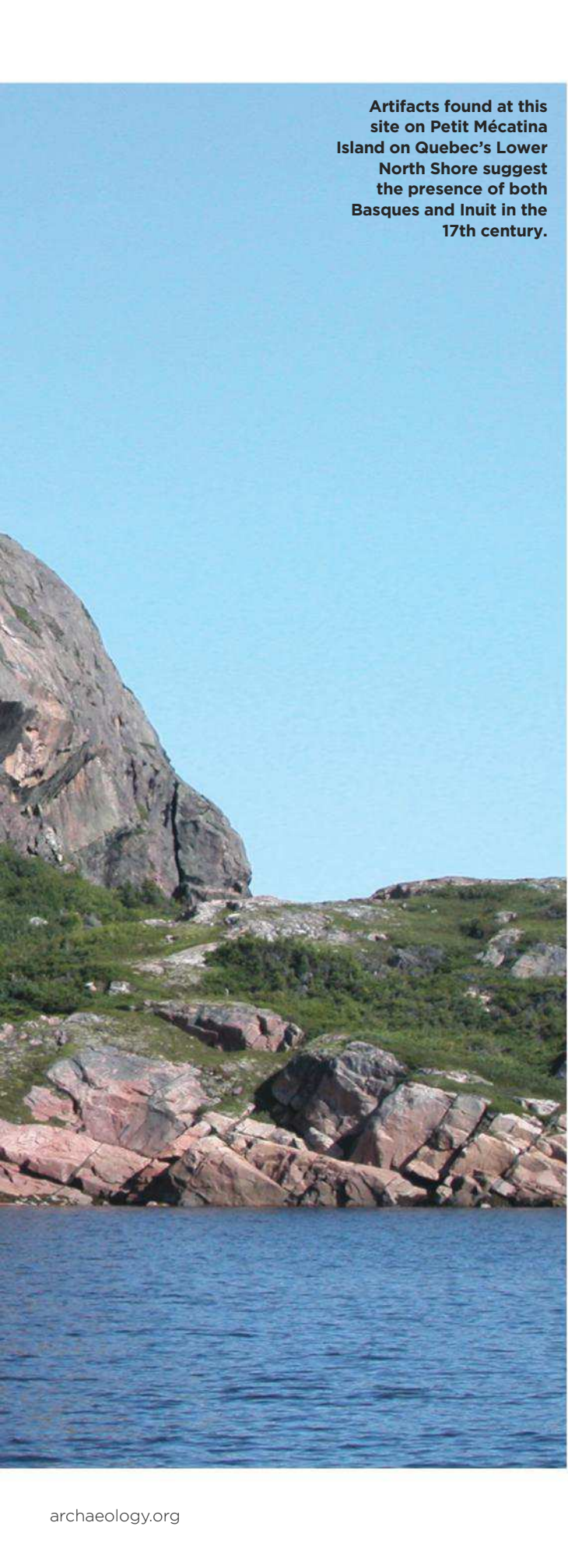


The most widely consumed beverage at Clapham's Coffeehouse was actually tea, as evidenced by these teapots, which are among some 38 examples discovered at the site.









Artifacts found at this site on Petit Mécatina Island on Quebec's Lower North Shore suggest the presence of both Basques and Inuit in the 17th century.

# WHEN THE INUIT MET THE BASQUES

**A site in southeastern Canada bears evidence of surprising 17th-century interactions between peoples from disparate parts of the world**

by DANIEL WEISS

**T**HE NARROW ENTRANCE to Hare Harbor, on the eastern side of Petit Mécatina Island, just off Quebec's Lower North Shore, is obscured by cliffs and hills and therefore easy to miss. Inside, a mile-long bay protected by high hills on both sides leads to a deep-water cove abutting a raised beach, above which looms a thousand-foot-high cliff. In August 2001, as a storm raged in the Gulf of St. Lawrence, the cove provided a welcome refuge for a team led by archaeologist William Fitzhugh, director of the Smithsonian Institution's Arctic Studies Center. They were making their way up a 350-mile stretch of the Lower North Shore in a research vessel, searching for potential excavation sites. In particular, they hoped to find the southernmost settlements of the Inuit, the Arctic native people who were known to have been present in the region from the seventeenth through eighteenth centuries. After holing up for the better part of a day in the cove, Fitzhugh headed toward the shore to investigate the beach, the only spot that looked like a promising campsite. "As soon as we pulled up, I saw roof tiles eroding out of the bank," he says. "I knew exactly what that meant: We had a Basque site. They were the only ones in the history of the area who used roof tiles."

Since making landfall at Hare Harbor, Fitzhugh has led extensive excavations there, establishing it as one of the most significant Basque sites in the area. He has also excavated a number of Inuit settlements on the Lower North Shore dating to the seventeenth and eighteenth centuries. These sites have produced new insights into interactions between these two peoples, who had each traversed broad stretches of the globe to get there and who shared a thirst for exploration and





When archaeologists first arrived at the Hare Harbor site, they immediately knew that Basque fishermen had once been there due to the presence of a number of red roof tiles such as this one.

discovery even as they were frequently at odds when they met. They had company as well. In addition to the Basques and the Inuit, others, including the French and the native Innu, competed to exploit the region's rich resources, leading to a tangle of shifting alliances and rivalries. "It was kind of like a gold rush scenario," says Fitzhugh. "There were very productive fisheries with baleen whales, huge amounts of codfish, salmon, seals, and a bit of walrus probably, too. All the Europeans were trying to make a buck and get back home with the goods."

Native to a region straddling the border between France and Spain, the Basques have a long history as intrepid mariners and fishermen and were among the first Europeans to visit this part of North America. Starting at least as early as the tenth century, the Basques honed the art of hunting whales in the Bay of Biscay, just off their home shores. By the 1520s, and perhaps significantly earlier, they were crossing the Atlantic each summer to get to the rich whaling grounds of the Gulf of St. Lawrence and the Strait of Belle Isle, the waters bordered on the north by Quebec's Lower North Shore and southern Labrador and on the south by the island of Newfoundland. In the fall, they would return to Europe, their ships laden with whale oil. Basques from Spain came to dominate whaling in the area, which they termed the Gran Baya. By the 1570s, according to Brad Loewen, a University of Montreal archaeologist and expert on the Basques, some 30 large Basque whaling ships visited the region each year, with around half based at their major port, Red Bay, 150 miles northeast of Hare Harbor on the coast of southern Labrador.

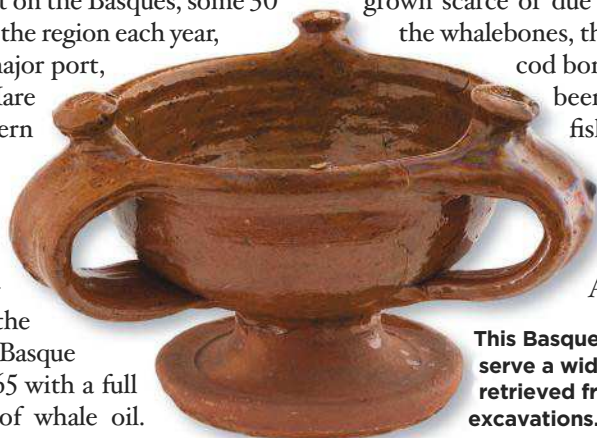
Excavations at Red Bay carried out from 1978 through 1992 illustrated the mechanics and grand scale of the Basque whaling operation. These included the excavation of *San Juan de Pasajes*, a Basque whaling ship that sank in late 1565 with a full load of nearly 60,000 gallons of whale oil.

Beneath the ship, three smaller craft called *chalupas* were discovered. The Basques used these 26-foot-long, two-masted wooden sailboats to pursue, harpoon, and tow whales to shore stations for butchering. One may possibly have been tethered to the larger ship.

At least 15 such stations were excavated at Red Bay. They featured tryworks that were used to render whale blubber into oil and were covered with the Basques' signature red roof tiles. A large cemetery containing the remains of more than 140 people was also discovered. Many of its graves included more than one person, most likely evidence of whaling accidents that caused multiple deaths.

The Basques liked to consider themselves independent of broader geopolitical currents, but they were swept up in them nonetheless. In 1579, says Loewen, Basque whaling operations in the Gran Baya faced a major crisis when England and the Netherlands, two major consumers of whale oil, imposed an embargo on Spanish imports. Shortly thereafter, much of the Basque whaling fleet was ordered to the West Indies to reinforce the Spanish navy, which had been weakened by English and Dutch attacks. "The Basques didn't like it, but they eventually complied," says Loewen. "That was a fairly major blow, and Basque whaling activity in the Gran Baya never really recovered, although it continued to a lesser extent for another century." While there are no historical accounts of a Basque presence at Hare Harbor, Fitzhugh's excavations at the site have provided rich evidence of Basque activity during the period after the heyday of whaling had passed. In the long run, though, the Basques were pushed out of the Gran Baya by France, which relentlessly expanded northeast from its base in Quebec City. By 1703, says Loewen, the French had come to dominate the entire Quebec Lower North Shore, and the Basques from Spain were no longer welcome in the region.

THE BASQUES FIRST ARRIVED at Hare Harbor in the late sixteenth or early seventeenth century and quickly got down to the business of hunting bowhead whales. Underwater excavations at the site have found the bones of at least seven individual whales, which settled at the bottom of the bay after the Basques dumped them into the water. Later, after a possible period of absence, the Basques shifted their attention to cod, either because the area's whales had grown scarce or due to changing market demands. Above the whalebones, the archaeologists found a thick layer of cod bones—almost entirely heads, which had been removed and tossed aside before the fish were salted and dried for the commercial market. "At some places, the layer of cod bones was almost eight inches thick," says archaeologist Erik Phaneuf of the engineering company AECOM, who directed underwater



This Basque chafing dish, used to prepare and serve a wide variety of food, is one of several retrieved from Hare Harbor during underwater excavations.





A large number of bird bones were among the food remains found in excavations at Hare Harbor. In 1833, John James Audubon visited the site, seeking specimens for his book *The Birds of America*.

excavations at the site. “That’s thousands and thousands and thousands of bones.”

The Basques at Hare Harbor ate just a small portion of the cod they caught, as they had access to a wide range of other food sources. They feasted on seals, pigs and boars, hazelnuts and walnuts, and peaches and plums, based on remains found at the site. Birds, including auks, puffins, gulls, grouse, and geese, made up a particularly significant and varied portion of their diet. Indeed, in 1833, Hare Harbor would be visited by the ornithologist John James Audubon, who, like Fitzhugh’s team, took refuge there during a storm while hunting specimens for his best-known book, *The Birds of America*. Audubon described the site in his journal as “the wildest place I ever was in,” apparently unaware that two centuries earlier, Basque fishermen had summered there year after year, living off the land and preparing and serving their meals on marmite cookware, tin-glazed porringers, and chafing dishes, to judge by ceramics recovered from the site.

The Basques, however, were not alone at Hare Harbor. The Inuit were there as well, as excavations on land made clear. Along with a Basque blacksmith shop and a Basque cookhouse or washhouse, archaeologists unearthed an Inuit winter house. All of these structures dated to roughly the same period, the mid- to late seventeenth century, based in part on the presence of a particular type of grey stoneware pottery from Normandy. It was clear that the Basques and the Inuit were interacting closely. Almost everything found inside the Inuit house had either been produced by Europeans or refashioned from

European materials. There were hundreds of nails, an iron ax identical to one found in the cookhouse midden, various types of European stoneware and earthenware, beads, pipes, and a number of knife blades. What’s more, several of the house’s walls were made not with traditional sod, but with charcoal, apparently produced by Inuit and Basques working together. Nearby, the archaeologists found a pit with extensive evidence of charcoal production, in association with both Inuit and Basque items. Nonetheless, while the evidence seemed to suggest that the Inuit were living in peaceful coexistence with the Basques, this made little sense based on what was known of relations between them. “In Labrador,” says Fitzhugh, “the whole early history of Europeans and Inuit was warfare, and the Basques were essentially fighting them off for the first hundred years.”

**T**HE INUIT, ALSO KNOWN as the Thule people, originally came to Alaska from Siberia, where they had developed a range of powerful adaptations to life in the Arctic, including hunting implements such as bows and arrows and lances. They thrived in coastal settlements, where they could speed across the ice in their dogsleds and hunt seal, whales, and walrus in their skin-covered kayaks and larger boats called umiaks. Between around 1300 and 1350, they rapidly covered the 2,500 miles from Alaska to Greenland, where they encountered the Norse. By 1450, the Inuit had made their way south into Labrador and begun to populate its coastline.

These Inuit migrations were prompted by a desire to follow their prey, primarily bowhead whales and harp seals, according to Fitzhugh. “It was kind of like an animal highway,” he says. “If you’re sitting around Greenland and you see these big



Amid the remains of a Basque cookhouse or washhouse, archaeologists unearthed evidence of the presence of Inuit women, which initially made little sense based on the history of strife between the Basques and the Inuit.





**This pit was likely used by both Basques and Inuit to make charcoal. The walls of an Inuit winter house located nearby were partially constructed of charcoal.**

migrations going south, you might say, ‘Let’s go, too.’” By the time the Inuit got to Greenland, expansion for its own sake had become something of an ethos for them, suggests James Woollett, a zooarchaeologist at Laval University in Quebec City who has studied Inuit sites in central and northern Labrador. “The Inuit have an ideology of exploration, of seeing what is in the next bay and figuring out how to live there,” he says. “They had been expanding along this seemingly infinite coastline for 400 years and they’d never reached the end of it. They’d gone to both sides of Greenland, and then they went to Labrador and followed that coast south.”

Around the time the Basques began whaling in the Gran Baya, in the early sixteenth century, the Inuit were making forays into the area as well. The Inuit were already familiar with the uses of iron, which they had obtained in limited quantities from meteoric deposits in Siberia, and in greater amounts from the Norse in Greenland. These dealings with the Norse may have piqued the Inuit’s appetite for further opportunities to obtain metal from Europeans, suggests archaeologist Lisa Rankin of Memorial University of Newfoundland, who has excavated Inuit sites in southern Labrador. “Once an encounter has occurred, there have to be stories about it,” she says. “The fact that out there somewhere were people who did stuff differently and had goods they wanted is absolutely something that would have been talked about.”

When the Inuit realized the Basques had iron as well, they tried to get as much of it as they could. The Inuit’s attraction to metal is striking, according to archaeologist Susan Kaplan of Bowdoin College, who has excavated Inuit sites in central and northern Labrador. “The minute the Inuit can get ahold of metal, you do not find any slate or nephrite tools whatsoever,” she says. “They would cold-hammer metal spikes and insert metal blades instead of slate blades into their ivory harpoon heads.” At first, the Inuit would raid unoccupied Basque camps during the winter, burn down the structures to harvest their nails, and make off with them and whatever other useful items they could. They would use roof tiles as whetstones or a source

of pigment and employed chalupas as a means of rapid and reliable transport on open water. Over time, the Inuit started to encounter the Basques face-to-face. Some of these meetings were productive, leading to trade, but some turned violent, and Inuit raids continued unabated. “They would trade by day and raid by night,” says Kaplan.

Although it was known that the Inuit had traveled to the Quebec Lower North Shore in the seventeenth and eighteenth centuries, the extent to which they settled there—at least temporarily—was unclear prior to Fitzhugh’s excavations. His team has now unearthed five sites with evidence of Inuit settlements, each of which generally includes at least two winter houses. These houses are typically constructed of sod and are distinguished by underground entrance passageways, paved floors, sleeping benches, and copious amounts of soapstone pottery, as well as items obtained from the Basques. While these sites establish that the Inuit settled on the Lower North Shore for some period of time, they do not appear to have been inhabited for as long as Inuit settlements that have been excavated in Labrador. “The middens of these Inuit houses in the Lower North Shore are very thin by Labrador standards,” says Fitzhugh. “People only seem to be living in these places for somewhere between five and 10 years. It may indicate the difficulties the Inuit have in establishing long-term residence because of the combination of forces against them.”



**Pieces of soapstone cooking pots, such as this one, are a clear indication that the Inuit were present at Hare Harbor, as no other group in the area is known to have used them.**

Chief among these forces were tensions with the native Innu. The Inuit, with their powerful bows and arrows and mastery of maritime life, had displaced the Innu from much of the southern Labrador coast. However, the Innu had since formed a close alliance with the French, who supplied them with rifles in exchange for high-quality furs trapped in inland areas. An anecdote from explorer Louis Jolliet, who had previously canoed down much of the Mississippi River, illustrates the consequences of this new imbalance of power. While making his way up the Lower North Shore and Labrador coast in 1694, Jolliet met a group of Innu on Gros Mécatina Island, just northeast of Petit Mécatina Island, where Hare Harbor is located, who told him that they had “defeated” four Inuit there the previous spring and that others had likely fled, fearing the Innu’s superior firepower.



In other cases, the Inuit seem to have been outmatched by the French themselves. Jolliet reported that St. Paul's River, located farther up the Lower North Coast, was also known as the Eskimo River, because the Inuit, whom Europeans called Eskimos, had once lived there, though they had left due to "fights they had with the St. Malo [a port in Brittany, France] fishermen." Fitzhugh started excavating at St. Paul's River in 2017, and has uncovered evidence that may help confirm this dynamic. Up the hill from the remains of an Inuit autumn house, the team found signs that the Inuit were planning to stay for the winter but never did. "It looks like they started to build a winter house, but didn't complete it for some reason," says Fitzhugh. "It has an entrance tunnel and paved floor, but when you get to the interior of the house, it's kind of like a hole. This was a very rich salmon and seal fishery area, and it seems the Europeans were not happy with the Inuit trying to settle there."

**B**ASED ON HIS TEAM'S excavations at Hare Harbor, Fitzhugh believes the Inuit there developed a close collaboration with the Basques—perhaps to help avoid the fate of their brethren in St. Paul's River and on Gros Mécatina Island. In addition to the signs that the Basques and the Inuit were producing charcoal together, the archaeologists unearthed evidence that Inuit women were working in the Basque cookhouse. It had a typical Basque slab floor, some Basque nails, and plenty of Basque roof tiles. But it also had a smattering of broken beads that appeared to have fallen off clothing. Basques did not wear beads, but Inuit women did. Broken pieces of soapstone pots, also typically used by the Inuit, turned up as well. Finally, on the Basque floor slabs, the archaeologists uncovered circular stains produced by hot seal oil spilled from soapstone lamps—used exclusively by the Inuit and generally tended by women.

The range of European items found in the Inuit house suggests to Fitzhugh that the Inuit most likely provided other services to the Basques as well. "The Inuit could help the Basques hunt whales or cod," he says, "and they could also guard the Basque stations during the six to eight months of the year when the Basques were back in Europe and the site was basically open for other native peoples and other Europeans to plunder and raid."

Given the Inuit's history of aggression, though, Kaplan is skeptical that they would have collaborated with the Basques at Hare Harbor. "It's an interesting scenario, but it puts the Inuit in such a passive mode, which I don't see on the central and northern Labrador coast at that point," she says. "I think it's a fascinating, intriguing site. I would just be careful how definitively to interpret what is going on." Fitzhugh notes, however, that the Inuit on the Lower North Shore found themselves in a far more precarious position than those on the Labrador coast, who had the advantage of greater



**This Basque oil lamp is among the many items made with iron that were recovered from the site. Metal objects were coveted by the Inuit, who would refashion them into tools.**

numbers and access to plentiful marine resources. They were able to establish an extensive trade network that sent massive quantities of whale and seal products south in exchange for European material. Inuit sites in Labrador tend to contain overwhelming numbers of seal bones, with just a small portion of caribou. On the Lower North Shore, these proportions were reversed, suggesting the Inuit there had reduced access to seals. Under these circumstances, Fitzhugh believes, cooperation with the Basques made sense. "I see these Inuit going south and discovering a whole new way to get along," he says. "Instead of trading and raiding and hightailing it back north to safety, these Inuit were taking the bull by the horns and finding a new way to make a life on the Lower North Shore by collaborating with Europeans."

Similar arrangements between Inuit and Europeans became more common in later years, Woollett points out. "There are plenty of parallel examples from the eighteenth and nineteenth

centuries farther north in Labrador where the Inuit are hired onto whaling boats or work as contract hunters," he says. "I have no problem at all with the proposition of similar practices earlier on." He notes,

however, that further archaeological research is necessary. Fitzhugh, for his part, hopes to find more evidence of early collaboration between the Inuit and Europeans, but suggests the situation at Hare Harbor may have been the product of a single Inuit group that took an innovative approach. "It may have been the result of an enterprising guy and his family who thought, 'We're going to do this in a different way. Instead of sneaking up and burning their places, maybe we can work with these guys,'" Fitzhugh says. This strategy may have been effective for a time, but in the end the Inuit could not survive on the Lower North Shore, and retreated to central and northern Labrador, where they thrived. "It was a dicey, chancy thing to do," says Fitzhugh, "and it didn't ultimately work out." ■

Daniel Weiss is senior editor at *ARCHAEOLOGY*.



**These beads, found on the floor of the Basque cookhouse, suggest to archaeologists that Inuit women were working in the facility.**



# FRAGMENTS OF ANCESTRAL MEMORY

**Native texts discovered in a remote church in Mexico belong to an ancient sacred tradition**

by ERIC A. POWELL

**L**YING IN THE FOOTHILLS of the Sierra Madre del Sur mountains of southeastern Oaxaca, the remote town of San Bartolo Yautepec is home to about 700 people. Some still speak the native Zapotec language, and many women in the town maintain a strong link to the past by creating textiles—widely admired throughout Mexico and beyond—using traditional weaving techniques. The town's eighteenth-century church remains an important center of community life.

In 2001, musician Cicely Winter, director of the Institute of Oaxacan Historic Organs, led a delegation to inspect the church's nineteenth-century pipe organ. While photographing and measuring the instrument, she noticed two wooden boxes with elegant old iron locks stored nearby. "We asked the local authorities what was in the boxes," says Winter, "but nobody knew and there were no keys for the locks." The community leaders decided to use a hammer to prize the nails out of the back hinges of the boxes, which proved to be full of documents. One contained loose sheets of nineteenth-century religious music, as well as band music and popular songs dating to as late as the 1960s.

In the other were documents of an entirely different character. "We wanted to whoop for joy," says Winter. What they had discovered was an extraordinary trove of bound manuscripts of seventeenth-century Gregorian chants and Latin liturgies. Upon closer inspection, Winter noticed that one book of chant scores was bound with two fragments of a still older manuscript. Placed upside down and facing the last page of finely copied musical notations, the deerskin parchments were painted with two rows of once-vibrant symbols and depictions of human figures—remnants of a sacred book belonging to a tradition that predated the Spanish conquest by hundreds of years.

After a years-long process of conservation and study,

Brandeis University archaeologist Javier Urcid and philologist Sebastián van Doesburg of the National Autonomous University of Mexico have determined that the two fragments are the remains of an ancient divinatory manuscript that were later



**This 18th-century church in the town of San Bartolo de Yautepec in southern Mexico had for more than 200 years held a cache of manuscripts sacred to both Christian and native traditions.**





Faded glyphs from a pre-Hispanic writing system can be seen on these deerskin fragments that once belonged to a sacred manuscript.



reused to form the inner layer of the back of the book of Gregorian chant scores. The fragments are among a small number of manuscripts written in pre-Hispanic glyphs known to have survived the widespread destruction of indigenous Mexican codices in the wake of the Spanish conquest.

The Yautepec fragments are unusual in that they were discovered in a remote area of Oaxaca, far from that region's central valleys, where other, previously discovered codices were likely made. They seem to have been written in a variant of glyphs unknown to scholars. But Urcid and van Doesburg have determined, thanks to similarities to other surviving codices, that the glyphs are part of a ritual calendar that was used by diviners to make prophecies, which Urcid likens to modern horoscopes. "These manuscripts were consulted by high-status people on a whole array of life crises," says Urcid. "Decisions touching every aspect of life would be made after consulting these sacred calendars."

The unusual afterlife of these fragments as part of a book of European religious music is helping researchers understand how native peoples strove to preserve their literary and sacred traditions by blending them with those of their new religion.

For native converts to Christianity, an act such as combining an ancient calendar with Gregorian chant scores would not only have helped keep the memory of a centuries-old practice alive, but would also have reinforced the power of their new faith.

LITERACY HAS A DEEP history in Mesoamerica, beginning with the Olmec, who are known to have begun using a script in the early first millennium B.C. By 400 B.C., Zapotec people in Oaxaca were erecting stones inscribed with glyphs denoting dates and names, and by 250 B.C. the Maya had created their own complex writing system. The Yautepec fragments belong to a much later tradition that began around A.D. 1250. At this time Mixtec scribes in the central valleys of Oaxaca began to employ a system of elaborate glyphs that denoted concepts or words. This system spread to people speaking non-Mixtec languages, such as the Nahuatl, or Aztecs, and continued to be used throughout central Mexico until just after the Spanish conquest, perhaps as late as 1550.

These glyphs were used to create two different types of manuscripts: historical narratives and divinatory calendars such as the Yautepec fragments. The historical texts recorded

Pages of Gregorian chant scores (left) are believed to have been bound together with the Yautepec manuscript fragments (right) sometime in the 17th century.







The Yauhtec pages once formed part of an elaborate sacred calendar similar to these examples from various manuscripts, some of the few to survive the Spanish conquest. Throughout Mesoamerica, diviners consulted such texts to help predict the future.

both mythical and actual events that legitimized the rights of royal houses. They typically began with creation stories and went on to tell of the deeds of ancient heroes and the founding ancestors of the royal houses. These texts also recorded events such as wars, marriage alliances, and the establishment of political borders.

In contrast to such historical narratives, divinatory manuscripts were not written as a continuous narrative, but were broken up into “chapters” made up of cells that depicted a person or symbol, each assigned to a day taken from a 260-day divine count. This count served as the sacred calendar for

many Mesoamerican societies, but was considered heretical by the Catholic Church, which tried its best to suppress it. A mid-sixteenth-century professor of rhetoric in Mexico City described it as “the sequence they deployed in their false and diabolic astrology, which I have described in order to highlight the deceit in which this miserable people have lived until now.”

Native people believed that a diviner well practiced in the art of reading the visual metaphors on these sacred calendars could use them to see the true nature of both human and divine motivations. This ability permitted them to advise on all kinds of events, from foretelling the success of a birth to





Photographs of both faded Yautepec fragments (above top, right top) were augmented with line drawings (bottom images, above and right) that show the calendars were organized into “chapters” made of up cells depicting a figure or object.

prescribing what people should do when getting sick. “They would also mediate all kinds of interpersonal conflict and relationships,” says Urcid. “A question often posed to diviners might be along the lines of ‘What will happen if I marry Juanita?’” Rulers would even consult diviners as to when would be the most auspicious time to raid another community.

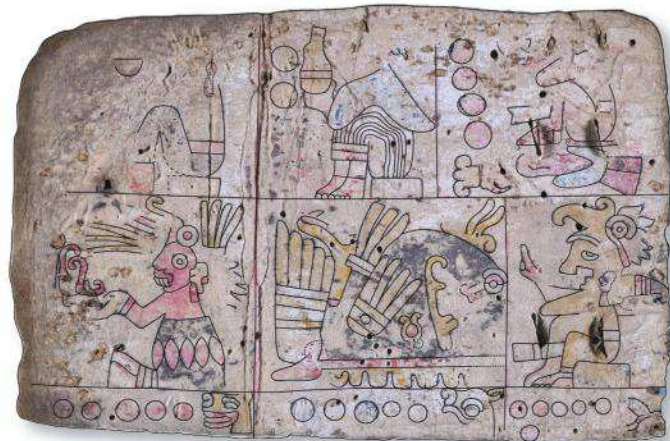
The two Yautepec fragments were once part of just such a sacred calendar. Each is divided into upper and lower chapters made up of three cells. While not all the cells are legible, those that can be read are painted with the image of a seated personage or an object next to a sign denoting a day in the divine count, such as Flint, Eagle, Dog, Serpent, Deer, Rabbit, Jaguar, or Flower.

Urcid and van Doesburg have been able to interpret two of the chapters by comparing them with chapters in other divinatory calendars that are now held at the Vatican. For example, one of the Yautepec fragments contains cells depicting a person holding a drinking vessel, a stand-alone tripod vessel, and an agave plant. It’s possible that this chapter may refer to the production and consumption of pulque, an alcoholic drink made from agave that continues to be important

to Mesoamerican people. The chapter is similar to scenes in a text held at the Vatican, known as the Codex Borgia, which also includes images related to agave plants that are thought to have been used to determine the success of a batch of pulque. Another chapter in the Yautepec fragments contains figures that bear similarities to those in another text housed at the Vatican that was used to determine the compatibility of a man and a woman. A diviner would have consulted this chapter if asked to predict the success of a marriage.

Intriguingly, the rest of the chapters in the Yautepec fragments have no known analogues in previously discovered manuscripts. Urcid also notes that the day signs Deer, Jaguar, and Eagle all diverge significantly in the way they are rendered from those in known manuscripts. “This is what led us to hypothesize that they were painted in a distinct scribal and divinatory variant,” says Urcid.

While the Yautepec fragments are the only known surviving examples of this written tradition, historical evidence shows that other pre-Hispanic documents were made in Oaxaca’s more remote southeastern mountains, where the Zapotec ancestors of the people of San Bartolo Yautepec lived. Notably, in the eighteenth century, a Friar de Mendieta wrote that while passing through the area, vicars from a Dominican convent showed him native manuscripts: “The Dominican friars found the painted leathers among the Indians living towards the south sea, who told them that these memories have been





passed down to them by their ancestors.”

Recent archaeological work is showing that these people were culturally complex. Indiana University archaeologist Stacie King led excavations of hilltop settlements in south-eastern Oaxaca that date from between the fourteenth and sixteenth centuries. She has demonstrated that there was considerable interaction there between different ethnic groups, including Zapotec, Chontal, and Nahuatl people. This suggests that the nobles of the area would have been part of an extensive network of ethnically diverse rulers who probably shared a common visual language that was used to create the Yauhtepec manuscript.

The discovery of the two fragments of a sacred calendar produced in this remote region confirms that the art of sacred literacy was not confined to Mixtec diviners, but might have once been widespread over a much larger and ethnically diverse area. “We don’t know who made this manuscript,” says Urcid, “but clearly it wasn’t just the Mixtecs of central Oaxaca who wrote about their cultural practices. It gives a voice to the other indigenous people of Oaxaca.”

URCID AND HIS COLLEAGUES believe the calendar the Yauhtepec fragments belonged to was likely made early in the sixteenth century, just after the arrival of the Spanish. It was probably collected by Dominican missionaries, and may even have been one of those shown to Friar de Mendieta. Urcid believes that at some point in the seventeenth century, an indigenous sacristan in a Dominican seminary in Nejapa, some 40 miles from San Bartolo Yauhtepec, used the recycled fragments to help make the book of Gregorian chants. “He may not have even known the content of the manuscript,” says Urcid. “But he inserted this token of the indigenous past into a book that represented the new order.”

Ethelia Ruiz Medrano, an ethnohistorian at Mexico’s National Institute of Anthropology and History, says there are many precedents for native people in Mexico combining Catholic and indigenous practices. For example, they sometimes included Christian documents in sacred bundles that contained ritually important objects and were used to communicate with the gods. Specifically, they would often put papal bulls, the significant public decrees or charters issued by popes, in their bundles. The practice became so widespread that the Spanish crown eventually ordered that no native people were allowed access to papal bulls. All known papal bulls in native hands were confiscated, but the



A page from a pre-Hispanic manuscript (above left) was inserted into a 16th-century Christian book (above right), one of many examples of how indigenous people combined Catholic and native texts.

tradition continued, as native people believed that including them in their bundles could only serve to add to the strength of the Christian god.

A sixteenth-century Nahuatl translation of the Acts of the Apostles offers yet another example of the practice of combining Christian texts with native manuscripts. This book contains a page from a Mexican codex covered with dozens of depictions of human heads that likely dealt with recording tribute to a royal figure. And in 1909, the walls of a church in the central Mexican state of Morelos were found to be covered with more than 100 fragments of codices. Native people apparently put them up with the acquiescence or even permission of Dominican priests, who may have been happy that the fragments covered a Franciscan mural that had previously decorated the church. Considered alongside these examples, the Yauhtepec fragments bound into the book of Gregorian chant scores belong to a rich tradition of native people marrying indigenous and Christian beliefs, a tradition that continues in many parts of Mexico today.

Winter notes another interesting aspect of the story of the Yauhtepec fragments. Thanks to a notebook found in the box with the Christian documents, we know they were likely brought to San Bartolo Yauhtepec in the eighteenth century by a Zapotec Dominican seminarian named Domingo Flores, a native of the town. Inside the notebook are annotations in Latin, Spanish, and Zapotec that show that Flores was learning to write and transcribe religious music. It is unlikely that he was the one who included the two fragments in the book of chants, but he might have handled the book and was probably aware that it preserved texts sacred to his ancestors. ■

Eric A. Powell is deputy editor at *ARCHAEOLOGY*.



# SHIPPING STONE

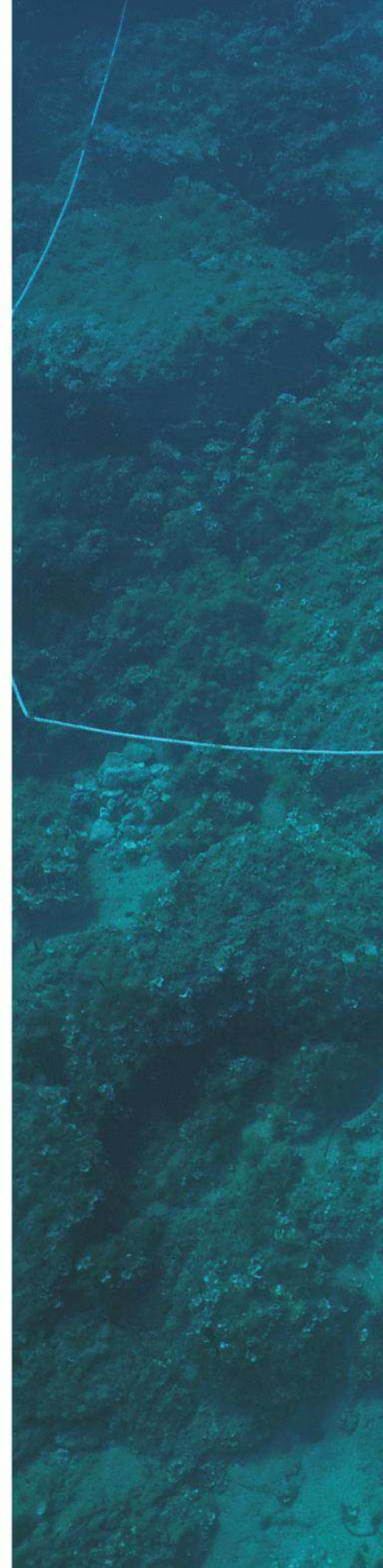
**A wreck off the Sicilian coast  
offers a rare look into the world of  
Byzantine commerce**

by ILAN BEN ZION

**N**EARLY 1,500 YEARS AGO, a Byzantine merchant ship swung perilously close to the Sicilian coastline, its heavy stone cargo doing little to help keep it on course. The ship's crewmen were probably still clinging to the hope that they could reach a safe harbor such as Syracuse, 25 miles to the north, when a wave lifted the vessel's 100-foot hull and dashed it on a reef, sending as much as 150 tons of stone to the seafloor. The doomed ship was carrying a large assemblage of prefabricated church decorations—columns, capitals, bases, and even an ornate ambo, or pulpit. These stone pieces lay on the seafloor for 14 centuries until a fisherman spotted some in 1959 while hunting for cuttlefish.

Covering an area a bit smaller than a football field and lying under 25 feet of water nearly a mile offshore of the fishing village of Marzamemi, the site was first studied in the 1960s by Gerhard Kapitän, a pioneering German underwater archaeologist. He believed the Marzamemi shipwreck played an important role in a massive state-led building campaign ordered by Justinian I, the great Byzantine emperor known as the “Last Roman,” whose name is synonymous with a resurgence in the fortunes of the Roman Empire in the Late Antique period. Based on several design details on the decorations, Kapitän concluded that not only had the ship sunk during Justinian's reign, but that it had probably taken on its cargo—the decorative elements of a church's nave—near Constantinople before heading west. He wrote that the marble blocks pointed to “the existence of a large organization clearly directed by a central

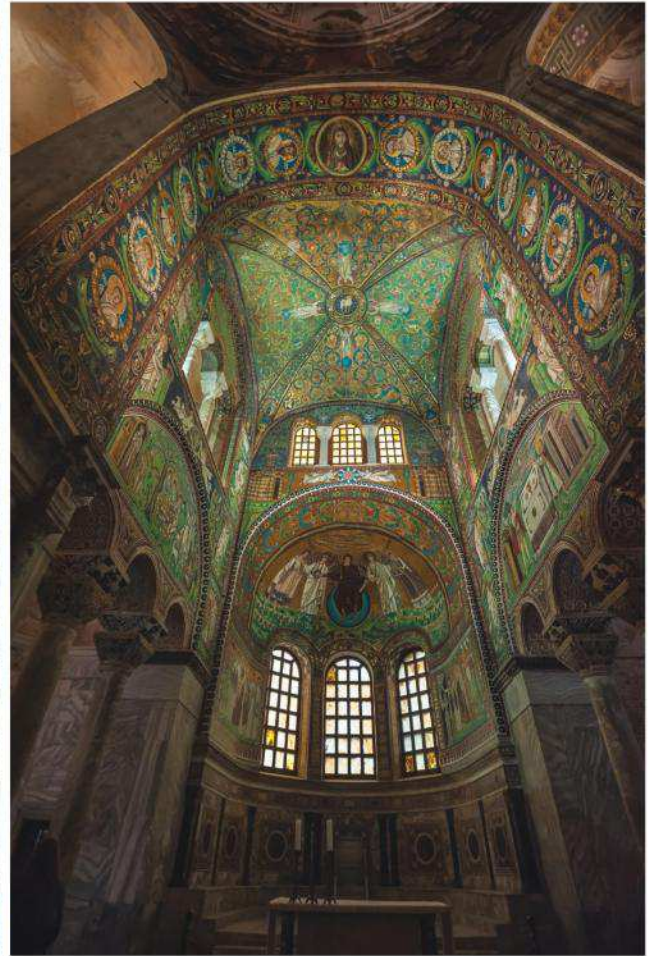
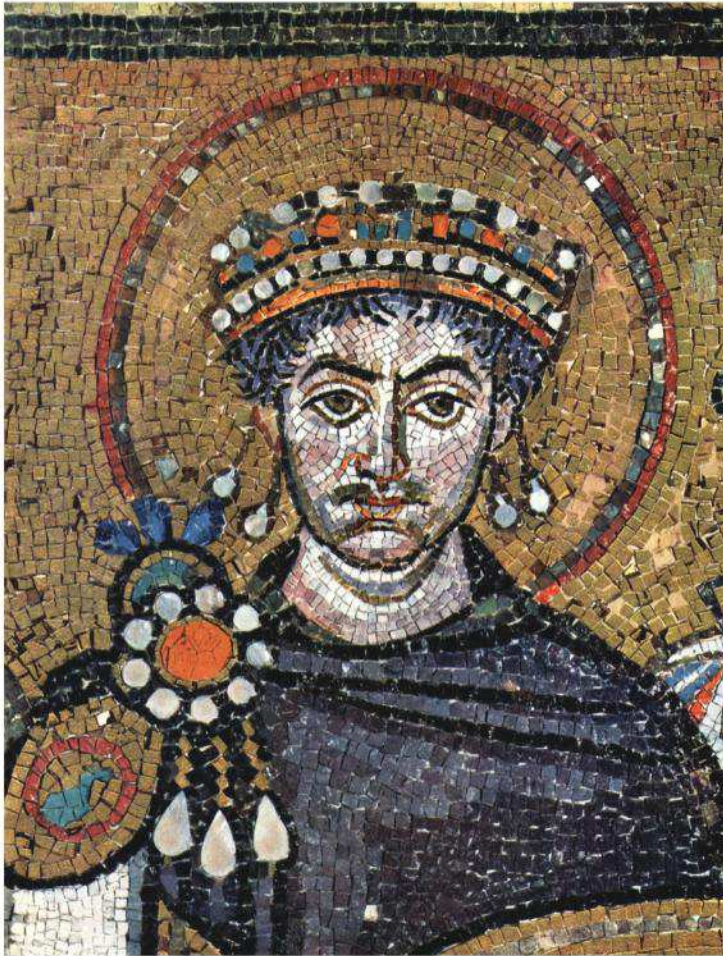
**An underwater archaeologist prepares columns to be hoisted off the seabed at the site of a 6th-century Byzantine shipwreck. The vessel was carrying stone architectural elements intended to decorate the nave of a Christian church.**











**A mosaic depicting the Byzantine emperor Justinian I (left) decorates Ravenna's Basilica of San Vitale (right). The monumental building was one of many constructed during his reign, which lasted from 527 to 565.**

administration" that dispatched the decorations for a new state-built church. Kapitän felt the Marzamemi marbles constituted "an almost complete set of elements for a Byzantine basilica with the certainty that all the parts are original and of the same period."

Now, Stanford University archaeologist Justin Leidwanger and Sicily's regional assessor for cultural heritage, Sebastiano Tusa, have returned to the Marzamemi shipwreck at the head of a team of archaeologists who are conducting a methodical underwater excavation amid the site's boulders and reefs. Among the questions Leidwanger and Tusa want to answer are how the marble cargo got there and who was responsible for dispatching this consignment of expensive goods. "Somehow, the narrative of the shipwreck has been stuck since the 1960s in this notion that it's Justinian's church in a box," Leidwanger says. "We have tended to assume that this is Justinian and his personal imperial circle shipping out churches to the corners of the Mediterranean." But the team's initial results point to a more complicated reality, a world where Justinian may have been emperor, but where commerce, including the shipment of large stone cargos, flourished because of the decisions of people whose names are lost to history.

**M**ERCHANTS HAD BEEN shipping high-end decorative stone across the Mediterranean since at least the Bronze Age. While no shipwrecks carrying stone have been found dating to this period, it is evident that marble was shipped from ancient quarries on Aegean islands such as Paros and Naxos to sites that didn't have their own sources. Shipwrecks carrying finished stone statuary dating to the later Archaic and Classical periods have been found off the coasts of Italy and Greece. But the shipment of stone for construction at an industrial level didn't begin until the advent of the Roman Empire. "It really takes off then on a distinctly Roman scale," says Benjamin Russell, a University of Edinburgh archaeologist who has studied Roman shipwrecks bearing stone cargoes. "You see a growth in administrative systems for shipping decorative stone throughout the empire." Based on the number of shipwrecks found carrying stone bound for temples and other important buildings, the trade peaked in the third century A.D., when 24 ships bearing stone cargo are known to have sunk.

Then, in the fifth century, the Roman Empire was torn asunder. Its western provinces fell to the Germanic Vandals, Visigoths, and Ostrogoths, and long-distance trade networks collapsed. By the time Justinian I took power in 527, a Roman state encompassing the entire Mediterranean was a bygone



reality. From Constantinople, Justinian began to pursue an imperial policy of restoring the empire by reconquering territories that had fallen to the Germanic kingdoms. His armies captured North Africa, Italy, part of Spain, and the main Mediterranean islands in the 530s. Justinian then set out to renovate and build fortifications and churches in an effort to reconsolidate the empire and promote his vision of Christianity.

Procopius, Justinian's court chronicler, wrote a book cataloging Justinian's extensive building projects, lavishing praise on the emperor for securing and beautifying restored Roman lands. Though Justinian is best known for building Hagia Sophia in Constantinople, he also ordered the construction of churches, fortifications, castles, baths, aqueducts, cisterns, and monasteries across the empire—from Jerusalem in the east to Spain in the west. Marzamemi lay at an important crossroads of the newly invigorated empire, where the two halves of the Mediterranean meet, an intersection of the trade routes crisscrossing the sea separating Europe and Africa.

**T**OGETHER WITH Brock University archaeologist Elizabeth S. Greene, Leidwanger has returned to the underwater landscape at Marzamemi each summer since 2014. The relatively shallow water allows long workdays so that two teams of underwater archaeologists can carry out dozens of dives each day to gently sweep away and suction up silt while searching for artifacts.

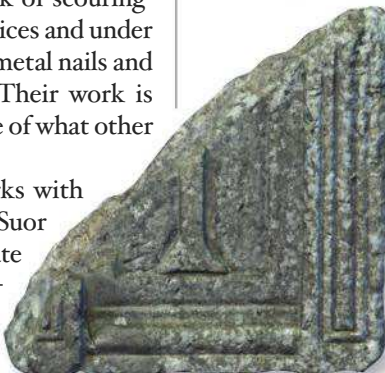
Unlike Kapitän's, Leidwanger's focus isn't primarily on the monumental hunks of marble, which are now pitted by constant exposure to salt water. Instead, he and his team have the arduous task of scouring the seafloor for the small artifacts hiding in crevices and under rocks: ceramics, bits of pigment and raw glass, metal nails and fasteners, and fragments of the vessel itself. Their work is resulting in a much more comprehensive picture of what other goods went down with the ship.

Meanwhile, ashore, the Stanford team works with specialists led by architect Leopoldo Repola of Suor Orsola Benincasa University in Naples to create 3-D reconstructions of the architectural elements and conserve the artifacts hauled out of the sea in a winery-turned-museum. The 3-D

reconstructions allow for close study of the marble remains and are giving the team a new look at the Marzamemi shipwreck's ecclesiastical cargo. They have also recovered several more capitals besides the 28 capitals and 28 bases identified by Kapitän. And while they have also recovered hundreds of pieces of additional columns, they have located no further bases. These discoveries challenge Kapitän's belief that the Marzamemi shipwreck was carrying a single, uniform set of church decorations. Leidwanger also notes that the ship's fluted columns are "not as standardized as one would think." The reconstructions show that the capitals may not all have



**Amid the cargo excavated at the shipwreck site is the corner of a stone ambo (above), or pulpit. Two other sections belonging to the ambo (left and below) are decorated with Latin crosses.**



been at the same stage of completion, and have revealed that some of their ornamentation is of an antiquated fashion for Justinian's time. The team has found some bits of polished marble that Leidwanger likens to modern countertop samples, perhaps for showing to potential clients in antiquity. All this suggests that the merchant vessel that sank at Marzamemi could have been involved in trans-Mediterranean marble trade for a clientele outside the emperor's circle.

A profusion of amphoras and other big storage vessels also helps create a picture of a ship that wasn't just hauling imperial





The cargo's decorative elements were likely bound for a church of the same dimensions as the Basilica of Sant'Apollinare Nuovo in Ravenna (above). 3-D imaging of the shipwreck's columns, such as this one (right) allows researchers to determine the degree to which they were finished.



construction material on orders from Constantinople. Instead, it may have been an ordinary merchant ship traveling around the Mediterranean that took on a large shipment of marble. "In fact, much of what we find," says Leidwanger, "whether it's the sort of secondary cargo of wine, oil, and the like—tells us about a crew that's routinely engaged in commerce."

**P**ROCOPIUS WROTE THAT he documented Justinian's profligate building "so that it may not come to pass in the future that those who see them refuse, by reason of their great number and magnitude, to believe that they are in truth the works of one man." But Leidwanger and other modern scholars see room for local initiative in church building during Justinian's revival. Not everything had to be micromanaged by Constantinople. "I think we really should be questioning the extent to which we need somebody like Justinian involved in this," Leidwanger says of the Marzamemi church wreck.

Although monumental edifices such as Ravenna's Basilica of San Vitale, whose gilt mosaic preserves Justinian's likeness, were probably built and designed by the imperial court, churches of lesser magnitude were likely financed and designed by provincial patrons,

says Joseph Alchermes, an expert on early Byzantine art at Connecticut College. "For certain kinds of imperial projects, I really can't imagine anything but a pretty centralized administration," he says. But he notes that probably wasn't always the case. While Constantinople was pushing its style of architecture as a means of asserting authority, local officials would have tried to assimilate by adopting the fashion of the time. Alchermes says, "It's a two-way street."

While some of the Marzamemi shipwreck marbles resemble the architecture in the Basilica of Sant'Apollinare Nuovo in Ravenna, Leidwanger has found that the marbles don't

comprise a complete church. Most religious buildings of the time would have been built of local material and only embellished with luxurious appointments. "These are the highlights, both visually and liturgically, in the church decoration," says Alchermes. "These are the things that people really focus their attention on."

Looking beyond the top-down imperial hypothesis may also help solve the question of where the Marzamemi marbles were bound. "Justinian is not sending some massive, beautiful, high-end church to some Podunk town. That's not how it works," says Leidwanger. Instead, the cargo could well have been ordered by local authorities furnishing their churches with prefabricated decorations. This begins to suggest a number of options for where the cargo could have been going. Some candidates for destinations include northern Italy, the Adriatic coast, or North Africa.

"The picture at Marzamemi is nowhere near as neat as was originally assumed," says Russell. "What they've shown is that rather than one church, the cargo could have contained multiple elements intended for several buildings, and that changes the way we think about who was responsible for the cargo." Russell points out that since the Marzamemi wreck was discovered, at least nine other shipwrecks bearing some stonework dating to the sixth century have been found in the Eastern Mediterranean, and that probably many more still wait to be found. "Marzamemi isn't an outlier," says Russell. "It fits into this context of resurgence in trade in the Late Antique period."

Meanwhile, work at the site continues, and the study of the shipwreck's more humble items promises





An archaeologist (above) surveys the site of the shipwreck for small artifacts, including ceramics such as amphora lids (right) and bits of pigment (below). Modest items such as these are helping the team gain a richer understanding of the merchant vessel's cargo.

to help flesh out the vessel's story. Recently the team subjected iron concretions found on the shipwreck to X-rays and CT scanning. They found that while many are square nails used for the construction of the ship's hull, others seem to represent a more diverse range of materials that may include tools such as chisels and hammer heads. These could have simply been basic shipboard tools for the repair and maintenance of the vessel or could have belonged to specialists in marble carving who accom-



panied the cargo in order to finish the stone decorations once they reached their final destinations. In the future, 3-D casts of the scans of these objects may help resolve such questions. Another promising area of research lies in further analysis of ordinary pottery found amid the boulders of the Marzamemi reef. Identification of the provenance of these ceramic wares could help reconstruct a logbook of the ship's route. That itinerary would provide Leidwanger with valuable information

about how the merchants of the Byzantine world took advantage of Justinian's restoration of Roman power throughout the Mediterranean—a restoration that was short-lived.

The pan-Mediterranean empire Justinian forged gradually disintegrated after his death in 565, and the economic connections that bound that world together once again fractured. As a result, the stone trade fell off. Only two Byzantine wrecks dating to the seventh century bearing stone have been found, and none at all dating to the centuries following. In fact, the trade in major stone consignments represented by the Marzamemi shipwreck would not resume on the same scale in the Mediterranean for almost a thousand years after the vessel went down. ■

*Ilan Ben Zion is a journalist in Jerusalem.*



LETTER FROM BROOKLYN

# NEW YORK CITY'S DIRTIEST BEACH

**Long-lost clues to the lives of forgotten New Yorkers are emerging from the sands at Dead Horse Bay**

*by* JASON URBANUS

Brooklyn's Dead Horse Bay looks about as appealing as it sounds, resembling something out of a postapocalyptic movie. On most days it is devoid of people, yet an improbable amount of debris blankets its shores. Glass bottles, old leather shoes, car tires, broken dishes,

children's toys—along with mysterious sun-bleached bones—are everywhere. As waves splash against the hundreds of thousands, if not millions, of glass fragments on the beach, and then retreat, a sound almost like wind chimes can be heard. This otherwise quiet and remote peninsula juts out

into the mouth of New York's Jamaica Bay. Given its prominent position at the bay's entrance, one might assume that this barrage of material came to rest on this sandy spit through the idiosyncrasies of tide and current. But larger, heavier items such as metal safes, car parts, chunks of flooring,





**Low tide along the shoreline  
of Dead Horse Bay reveals  
thousands upon thousands  
of glass bottles, household  
items, and bones dumped  
as part of more than one  
hundred years of New York  
City urban development and  
landfill projects.**





## LETTER FROM BROOKLYN

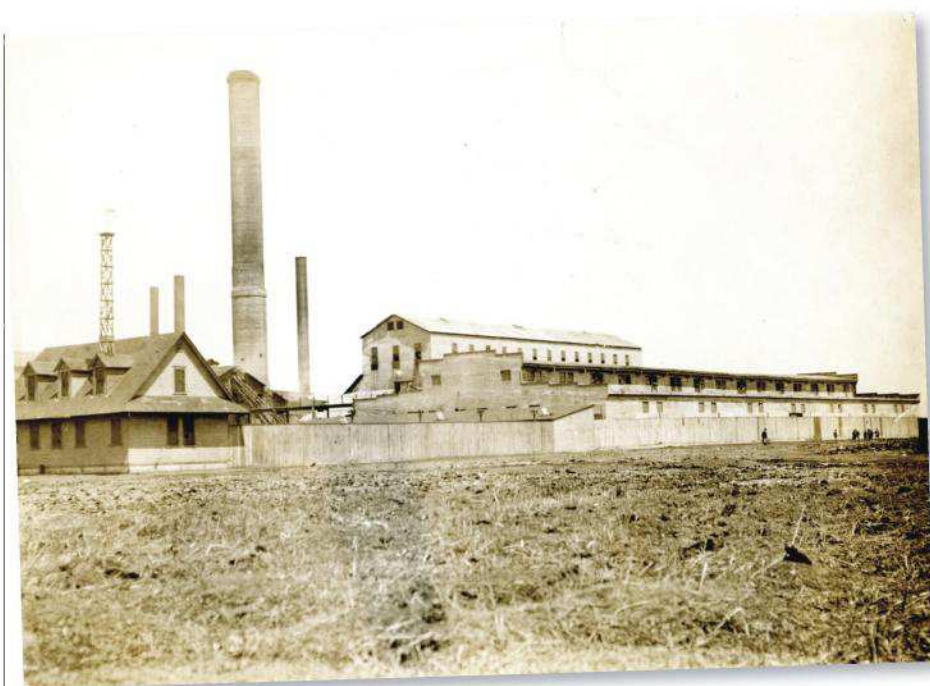
and bathroom fixtures suggest that it was not chance that bore these artifacts here.

The sea- and sun-stained appearance of objects, the rust, the faintly legible labels bearing the names of unfamiliar and long-defunct companies, and, of course, the bones, suggest that this material is not new. In fact, these objects were buried here decades ago but are now gradually reemerging along the beach. They are not just rubbish, nor flotsam or jetsam, but the remnants of little-known chapters in New York City's history.

The shores along today's Dead Horse Bay were once part of a place called Barren Island. Although Barren Island is nowhere to be found on most modern maps of New York, this peculiar little place played an integral role in the city's history. "It's archaeologically very rich, but also very tangled and complicated because of the many different uses that the geography has had," says Robin Nagle, an anthropologist at New York University. This area today little resembles the tidal flats, salt meadows, and sandy beaches that Dutch settlers first encountered in the seventeenth century and curiously named Beeren Eylandt ("Island of Bears"). Originally, the island comprised about 30 acres of uplands and 70 acres of salt meadows,



**A rusty sink lies conspicuously on the beach, just one item amid debris from the many buildings torn down when their residents were evicted to make way for development.**



**An early 20th-century photograph shows one of Barren Island's several waste reduction factories. Workers and their families made their homes there despite the island's foul odors.**

but land reclamation projects during the first half of the twentieth century permanently altered the topography. Well before that, however, its remote location made it the perfect spot for solving an intractable city problem.

It is fitting that today, in the twenty-first century, Dead Horse Bay is notorious for having New York City's filthiest beach, since throughout its history, this particular corner of New York has been synonymous with refuse, offal, and unpleasantness. That reputation dates back to the mid-nineteenth century, when the city began shipping its garbage to Barren Island.

Located around a dozen miles southeast of downtown Manhattan, the area was relatively peaceful during New York's early history. But its remoteness eventually caught the eye of city officials and entrepreneurs. By the mid-nineteenth century, New York faced a serious dilemma about what to do with its rubbish, particularly its deceased horses. In an era before cars, horses were everywhere and, of course,

they died. One might not give it much thought today, but disposing of a horse carcass was not an easy task, and often they were simply left to rot in the streets. After a cholera epidemic broke out in the city, officials decided to seriously crack down on health hazards, which included finding a resolution to its dead horse problem. Because Barren Island was mostly uninhabited and was isolated from the rest of the city, it was deemed a logical location to build the much needed, and extremely odorous, animal disposal facilities.

By 1859, the first two horse rendering plants appeared. They would not be the last. Between then and 1934 as many as 26 different waste management companies set up shop. Barges delivered the putrid and rotting carcasses to the island daily, where the remains were dismembered, chopped up, and boiled in large vats. The horse fat, blood, tissue, and marrow were used to manufacture a variety of profitable products, including fertilizer, glue, soap, grease, and even nitroglyc-



erin. As many as 20,000 horses (in addition to dead cats, dogs, and other stray animals) were processed in a single year. The skeletal remains were tossed into this small inlet in Jamaica Bay, giving rise to its new moniker. Century-old horse bones remain plentiful and visible along its shores today.

Once the horse rendering industry was established on Barren Island, other similarly noxious trades joined them, such as fish and guano processing. By the end of the nineteenth century, New York City was not just sending its dead animals to Dead Horse Bay, but almost all its household garbage as well, to be incinerated, reduced, and processed in its facilities. At its height, it was receiving 3,000 tons of garbage a day, on top of all the dead horses from Manhattan, the Bronx, and Brooklyn, making it the largest waste reduction site in the world.

For the factory workers and their families, life on Barren Island was nearly intolerable. The stench from burning flesh was detectable four miles away and capable of inducing sickness at two miles. Nonetheless, a small community developed there, just a few hundred yards from the furnaces. It consisted mostly of poor European immigrants and black Southerners—the only groups willing to work under such awful conditions. Residing and working on Barren Island came with a social stigma. “The people that lived there were doing work that was essential to the city’s public health, yet they themselves were ostracized and painted as sort of semi-savage and not even quite human,” says Nagle. At its height around the turn of the twentieth century, Barren Island’s population peaked at between 1,500 and 2,000, which does not include the swarms of wild dogs and pigs that plagued the island and scavenged the decomposing offal. In addition to the industrial complexes, the island contained a few streets, a school, a couple of churches, a post office, and several saloons.



**The skeletal remains of thousands of animal carcasses rendered at Barren Island were thrown into the bay. Bones, like the one above, still appear along the shore today.**

By the beginning of the twentieth century, a number of factors led to the gradual diminishment of Dead Horse Bay’s waste industries. Not only had cars begun to replace horses, but the complaints from encroaching Brooklyn neighborhoods about the island’s noxious odors reached a fever pitch. The controversy even embroiled then-governor Theodore Roosevelt, who called Barren Island a “nuisance of the worst kind” and vowed to transfer its industries to other locations. The city finally stopped shipping its garbage there in 1918 and the animal processing factories gradually began to shutter. Today, the horse rendering facilities, the smokestacks, and the rows of workers’ houses are gone. Very little of Barren Island’s former infrastructure remains apparent, apart from a few decrepit wharves where the garbage scows and horse barges once docked.

As these industries closed and the workers moved out, the city devised a new plan for Dead Horse Bay. In the 1920s, landfill projects began expanding Barren Island’s shores, and it was eventually joined to the mainland. The principal motive behind this was the construction of Floyd Bennett Field, the city’s first municipal airport, but other projects continued to further alter the topography. The last remaining residents were forcibly evicted by controversial New York City Department of Parks commissioner Robert Moses in 1936 who planned to build a new park, new roads, and a major

bridge connecting Barren Island to Jamaica Bay’s south shore. City residents from other parts of New York would soon have their histories intertwined with those of Barren Island and Dead Horse Bay.

From the 1930s until the 1950s the island’s terrestrial footprint continued to grow as the city dumped its garbage into the bay and covered it with soil, thereby manufacturing new usable land. Moses oversaw much of this land reclamation project. Perhaps no other individual transformed the topography of New York City and the surrounding region to as great a degree. For almost five decades, his innumerable urban development projects created new parks, bridges, recreational areas, and hundreds of miles of highway. Moses also loved to build land itself. He converted thousands of acres of New York’s waterways and wetlands into usable space by filling them with the city’s waste.

This process was not always as innocuous as it might sound, especially as it pertained to Barren Island, and Moses, who died in 1981, remains a polarizing figure. What the artifacts at Dead Horse Bay clearly show is that the fill used there was not just common refuse. It was made up, rather, of the forfeited possessions of countless New York City households whose owners were forced to leave them behind. “Every time I go to Dead Horse Bay, I am deeply moved,” says Nagle. In addition to her teaching

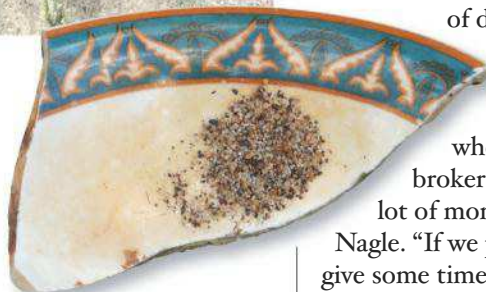


## LETTER FROM BROOKLYN

duties, Nagle is also the anthropologist-in-residence at New York City's Department of Sanitation. For close to two decades she has been sorting through, collecting, and analyzing the debris along Dead Horse Bay. In that time, she has noticed a difference in its "garbage" that distinguishes it from other landfills in the city. "I don't think there was ever much trash here," she says. "I think this is, by and large, rubble of houses, stuff of people's lives, things that filled homes—the intimate, personal, mundane stuff of everyday life. That is now what is scattered on the beach."

Many of Moses' new city projects came at the detriment of working-class families. All over New York City, under the aegis of eminent domain, entire neighborhoods—usually poorer ones—were bulldozed to make way for Moses' new highways. Because lower income families commonly could not afford moving trucks and, in addition, were given limited time to decamp, they were forced to leave many of their belongings behind. In the early 1950s, as entire city blocks were obliterated, the rubble of those houses was scooped up in toto and dumped into Dead Horse Bay. Ultimately, these deposits were covered with a thin layer of sand and soil in order to build part of Marine Park, Brooklyn's largest public park. It was the city's intention that what lay beneath its newest beach and recreation area would remain forever obscured.

For reasons that are still not entirely understood, Moses' men did a horrible job of capping the fill for this particular project. As a result, now, some 70 years later, the archaeological remnants of those



**A myriad of ordinary household items dating to around the middle of the 20th century litter the shore and include everything from leather shoes (left), to roller skates (top), to decorated tableware (above).**

condemned households are reemerging along the shore. The scene is both haunting and engrossing. For archaeologists like Alyssa Loorya, founder of Chrysalis Archaeological Consultants, it is the deeply personal nature of some of the objects that is riveting. "On a trip there last year I saw some old vinyl records, perhaps part of someone's record collection. As an archaeologist," she says, "I am always fascinated by

the items that represent someone's personal interests."

Nagle likes to point out that Dead Horse Bay would be a perfect place for a Hollywood prop master to visit, one tasked with re-creating the interior of a 1950s New York apartment. People's homes and lives can be pieced back together through the veritable graveyard of objects here. There are food and drink containers, cleaning supplies, even small kitchen appliances. There are children's belongings such as toy soldiers, dolls, and roller skates. There are work-related items such as leather boots, hammers, and saw blades, and hygiene products such as deodorant canisters, toothbrushes, and combs. There are even parts of the buildings themselves—architectural elements, bricks, tile flooring, and door lintels. "That top layer

of debris is the story of people whose lives are rarely part of the formal account, who are not the power brokers, not the people with a lot of money and influence," says Nagle. "If we pay attention to it and give some time and thought to Dead Horse Bay, we will recover some of the story of the city."

And then there are the glass bottles, a seemingly infinite number. According to Nagle, one of the reasons there are so many of them is that a Prohibition era law made it illegal to refill or reuse any glass bottle. The law wasn't repealed until 1964, so for decades New York City was flooded with single-use glass containers.

Although one of Robert Moses' favorite methods for "rebuilding" New York was to create solid land where it previously didn't exist, this was by no means an innovation. New Yorkers had been extending their coastline

*(continued on page 62)*



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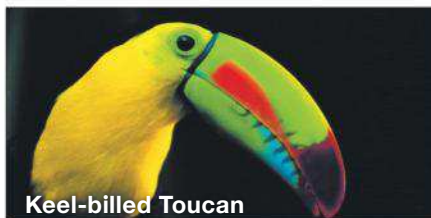
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## LETTER FROM BROOKLYN



**A chunk of tile flooring, likely from a demolished building, is just a small bit of the construction debris brought to Dead Horse Bay as landfill.**

*(continued from page 60)*

and creating real estate with landfill since the days of the earliest Dutch colonists. What is peculiar about the land reclamation in Dead Horse Bay is the process itself. After the rubble of wrecked houses and the belongings of displaced families were poured into the bay, they were never fully stabilized. When the last wave of dump trucks unloaded their cargo in February or March of 1953, Moses covered and sealed these layers with just a thin deposit of sand and topsoil, which inevitably has not endured over the past three-quarters of a century. “It’s puzzling,” says Nagle. “By that time landfill technology was already far more sophisticated than just dump and cover. Dead Horse Bay is basically a dump that feels like it got covered in a rush, and then city officials walked away. What on earth was the logic of doing such a sloppy job?”

Loorya thinks that the rural nature of the site and the fact that it was largely designated to be parkland and not intended to be heavily built upon may have influenced their shortcut approach. “In and around Jamaica Bay, you had a much more isolated area, and formal methods and cus-

tomary landfilling devices were not employed to create the land. There was no deliberate or coordinated effort to create city streets that would be inhabited,” she says.

Whatever the reasons may be for Moses’ and the city’s incompetence, the reality is that objects buried decades ago are now reappearing. “Varying environmental and climate factors

come into play with regard to Jamaica Bay,” says Loorya. “Climate change, storm erosion, and rising sea levels all contribute to the ongoing exposure of the landfill.”

Every storm, every anomalous high tide, eats further into Dead Horse Bay’s embankments and reveals new material. It appears endless. At low tide it is nearly impossible to take a single stride along the beach without stepping on a glass bottle or some early twentieth-century household item. This assemblage is currently at the center of an ongoing debate: Should it be considered archaeological and historical material or is it simply discarded refuse that is part of a public landfill? For decades, local artists and collectors have been combing the shores and illegally removing items of interest, arguing that they have free license to pick through and take whatever they want. Others want the bay to be considered a historical site and for the artifacts to remain in situ. For Nagle, the issue is complex. She can sympathize with both arguments, as both ultimately seek to preserve the legacy of Dead Horse Bay. “There is the loss from people taking things, but



**Perfectly preserved glass bottles shimmer beneath the bay’s shallow water. As waves cause them to strike one other, a sound eerily similar to that of wind chimes can be heard.**





A car lies partially exposed beneath the thin later of topsoil and vegetation that covers the landfill. The embankment recedes farther each year as it is eroded by the elements.

then there is also the loss due to time and tide and water given the volatility of Jamaica Bay. The glass is going to be somewhere under the water, but the smaller things, especially the lighter plastics, those will be lost forever, even if we don't take them," she says.

Part of the problem is that there has never been an extensive archaeological investigation. There have been small excavations nearby and informal surveys, but no organized evaluation has ever been attempted to either document what is there or to delve further into the history of Barren Island, Dead Horse Bay, and its landfill. "There has been no thorough archaeological analysis of any of it," Nagle says. "If we are looking at the subfield of archaeology—that is the archaeology of the contemporary past, then this is a perfect case study. It connects to so many really urgent themes like urban development and displacement. I have yet to find a precise source of the top layer. Where did that rubble come from? Whose homes were those that were torn down and dumped into this place?"

The decision to implement any

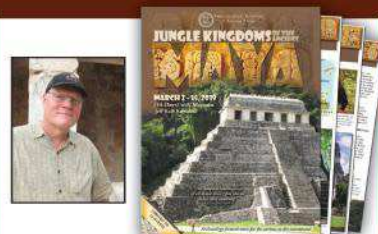
kind of formal archaeological project would have to be made by the federal government, as this section of Jamaica Bay is now part of the Gateway National Recreation Area, a 27,000-acre coastal national park. Whether or not an investigation is ever initiated, the objects on the beach along Dead Horse Bay will continue to be a tangible reminder of an intangible past—both of the families whose homes were destroyed and of the alienated community and the industries that once resided on Barren Island. There is still much to be learned either way. "We have a tendency as human beings to forget, and that's understandable. Our lives are full and the demands are many," says Nagle. "But in that forgetting we also lose a sense of who we are, and in the context of New York City, through Dead Horse Bay, we are able to not only learn more about the city itself, but also about our antecedents living just a few generations before us." ■

Jason Urbanus is a contributing editor at **ARCHAEOLOGY**.

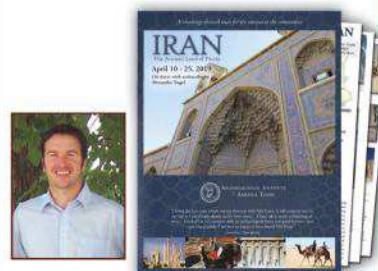


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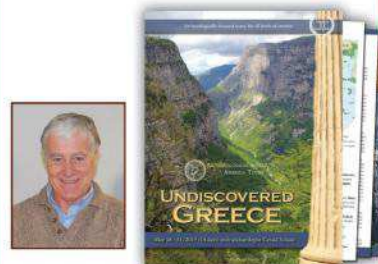
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Trying replica Roman weapons at an IAD event in the Czech Republic

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The annual celebration, established by the Archaeological Institute of America (AIA) in 2011, continues to expand globally. In 2017, more than 900 events were organized by over 500 Collaborating Organizations in two dozen countries. More than 200,000 people attended these IAD events around the world. In comparison, the first Archaeology

Day featured 115 events, 14 Collaborating Organizations, and participation by just over 15,000 people.

IAD events vary greatly and include archaeology fairs, laboratory open houses, classroom visits, special tours of museums or archaeological sites, symposia, conferences, meetings, student presentations, and lectures. In 2018, IAD will include a performance



art event organized by the Samara State Institute of Culture in Russia: *Archaeology as Scene of Culture: Voices of Things! Art-Archaeological Performance*, on view October 20–22, 2018. To see a full list of Collaborating Organizations and events, go to [archaeologyday.org](http://archaeologyday.org).

Although IAD officially takes place on the third Saturday in October, Collaborating Organizations hold events throughout the month. IAD, in addition to celebrating archaeology, is an opportunity for Collaborating Organizations to highlight the important work they do. Collaborating Organizations and their activities are featured on the IAD website ([archaeologyday.org](http://archaeologyday.org)) and included in the main IAD calendar.

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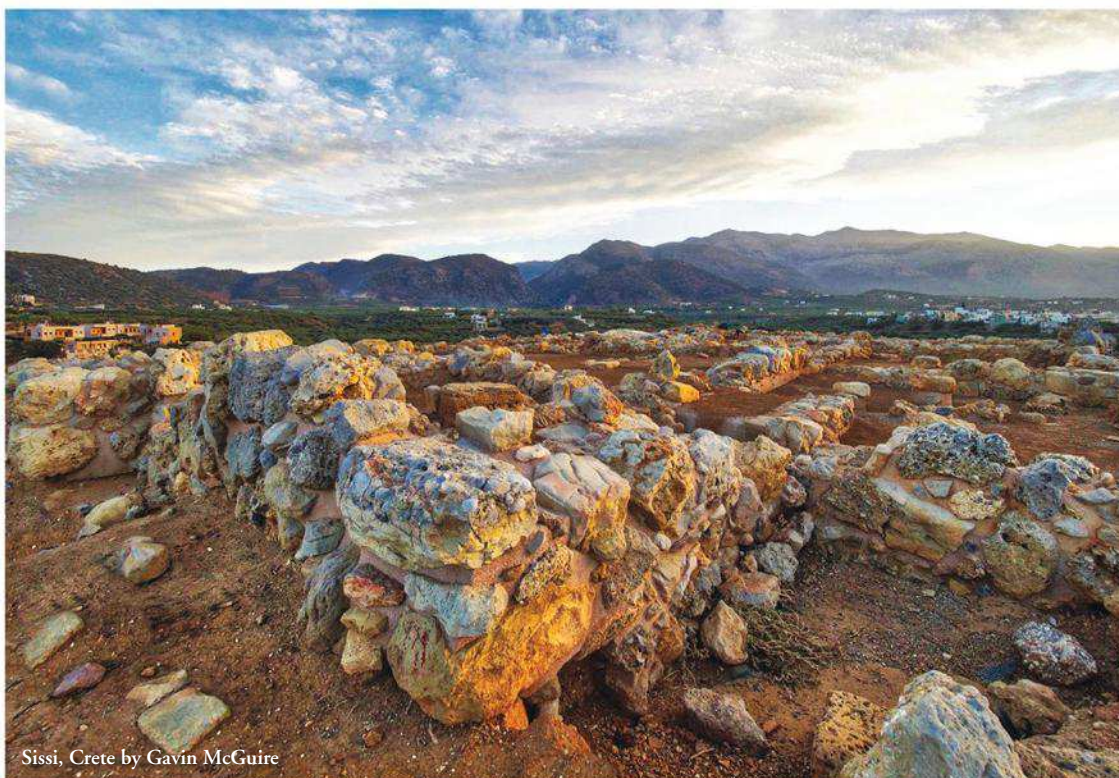


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Sissi, Crete by Gavin McGuire

More than 150 stunning photographs taken in 25 countries were submitted to the AIA for the 2018 AIA Photo Contest. As in past years, AIA members and friends selected the

winners. More than 13,000 votes were cast over the weeklong voting period. The big winner was Gavin McGuire, who won three of the five contest categories (Archaeological

Landscapes, Excavation, and Fun Finds). Luis Alberto Martinez Castro was the winner in the Monuments category and Alexia Giglio topped the Field Life category. You can see all the winning entries at [archaeological.org/news/aianews/27528](http://archaeological.org/news/aianews/27528). A dozen of the top photographs submitted to the 2018 AIA Photo Contest will be featured in the AIA's 2019 calendar. The calendar will be available this fall.

If you are interested in sharing your amazing

archaeological photographs with the AIA—and the world—enter next year's contest. We accept photographs in the five categories mentioned above.





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- Graduate Student Travel Award to assist graduate students presenting papers at the AIA Annual Meeting with their travel expenses. Deadline: October 30
- Harriet and Leon Pomerance Fellowship to support a project relating to Aegean Bronze Age archaeology. Deadline: November 1
- Helen M. Woodruff Fellowship of the AIA and the American Academy in Rome to support a Rome Prize Fellowship for the study of archaeology or classical studies. Deadline: November 1
- John R. Coleman Traveling Fellowship to honor the memory of John R. Coleman by supporting travel and study in Italy, the western Mediterranean, or North Africa. Deadline: November 1
- Olivia James Traveling Fellowship for travel and study in Greece, Cyprus, the Aegean Islands, Sicily, southern Italy, Asia Minor, or Mesopotamia. Deadline: November 1
- The Archaeology of Portugal Fellowship to support projects relating to the archaeology of Portugal. Deadline: November 1
- AIA/DAI Exchange Fellowships to encourage and support scholarship on various aspects of archaeology and promote contact between North American and German archaeologists. (AIA Fellowship for Study in the U.S. deadline: November 1; DAI Fellowship for Study in Berlin deadline: November 30)
- Samuel H. Kress Grants for Research and Publication in Classical Art and Architecture to fund publication preparation, or research leading to publication, undertaken by professional members of the AIA. Deadline: November 1
- Site Preservation Grant for the conservation and preservation of archaeological sites. Deadline: November 1

## AIA LOCAL SOCIETIES INTRODUCE NEW PROGRAM FOR MEMBERS

AIA Members' Forums are new events designed to provide opportunities for Local Society members to meet for engaging and meaningful conversations about archaeological issues. They are available to any Society interested in hosting one. Each Forum has a specific topic chosen by a task group within the AIA Societies Committee. The task group will have researched the topic and provided the Society with a study guide with background information as well as lists of resources and Forum questions.

Once a Society schedules a Forum, its leaders appoint a local committee or expert to lead the discussion. Materials can be distributed to members before the event. The Forum itself is meant to be a participatory conversation about the topic. The ground rules for the discussion can be set by each Society, and can vary depending on location, audience, amount of time available, and other factors they regard as pertinent.

As an example, and to read about a Forum on looted art that took place at the AIA Local Society in Minnesota, go to [aiamn.blogspot.com/2017/12/forum-on-looted-art-archaeology-and.html](http://aiamn.blogspot.com/2017/12/forum-on-looted-art-archaeology-and.html).

If you want to learn more about running a Forum, have ideas for a future topic, or are interested in serving on a task group, please contact Meredith Langlitz at [mlanglitz@archaeological.org](mailto:mlanglitz@archaeological.org).

## JOIN US

We encourage you to join the AIA. Your membership dues support archaeological excavations and research around the world. To become a member, go to [archaeological.org/join](http://archaeological.org/join). ARCHAEOLOGY magazine subscribers can upgrade their membership—which will include membership in their nearest AIA Local Society—for just \$40. To upgrade, go to [archaeological.org/upgrade](http://archaeological.org/upgrade).





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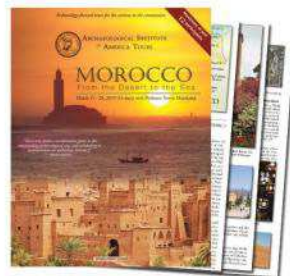
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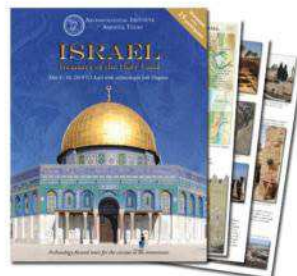
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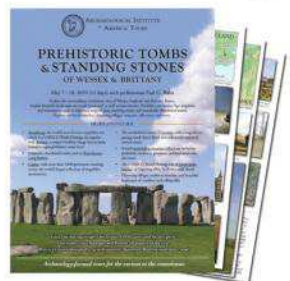
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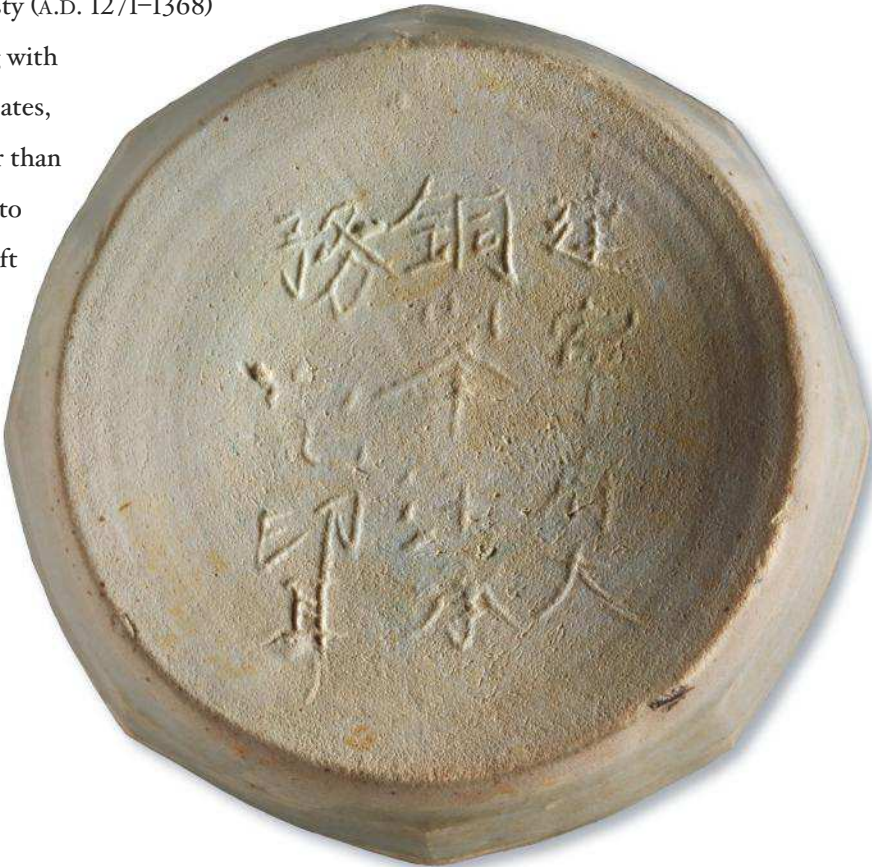


It may not seem that a single artifact recovered from a ship carrying more than 100,000 objects could dramatically alter scholars’ understanding of a historical period. But sometimes it can make a world of difference.

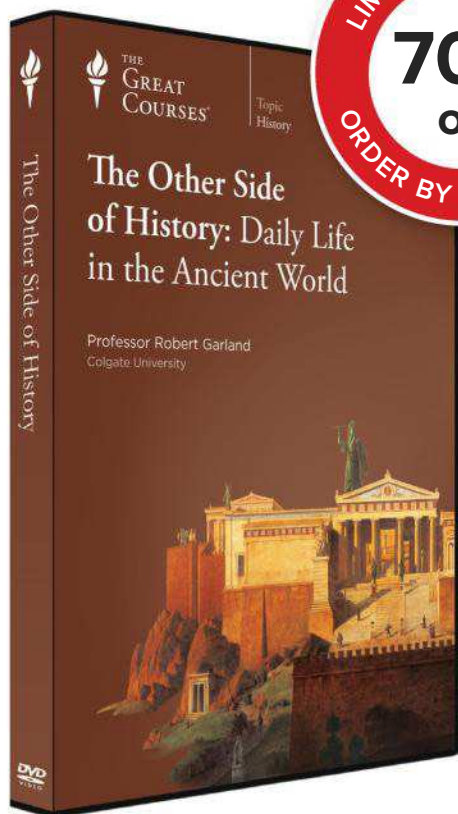
*Qingbai* glazing produces a bluish-white tint, and molded ceramic boxes made with this technique were used to hold cosmetics, jewelry, small mirrors, medicine, incense, or ink cakes. They were one of the most commonly exported kinds of ceramics during China’s Song Dynasty (A.D. 960–1279). According to Lisa Niziolek of the Field Museum in Chicago, who studies artifacts recovered from this Java Sea shipwreck, the box, with a peony on the top and an inscription on the bottom, is characteristic of these exports—but with an important exception. The inscription on this box is much longer than is usual and holds one of the keys to redating the wreck.

“Typically, if there is an inscription, it’s short and provides the name of the family workshop where the piece was produced,” says Niziolek. This particular inscription provides not only a surname (Ji), but also a place name, Jianning Fu (present-day Jian’ou in Fujian Province in China), an administrative designation it was given by the Song government. After A.D. 1278, the Yuan Dynasty (A.D. 1271–1368) changed the name to Jianning Lu. This, along with comparative ceramics and new radiocarbon dates, suggests the ship sank about 100 years earlier than initially thought. “Maritime trade had begun to increase at that time,” says Niziolek, “and shift from what had previously been a network of tributary missions to China by various Southeast Asian rulers and envoys to one more focused on open economic trade. This new data begins to help us define the roots of broad-scale, cross-cultural globalization in East Asia.”

| WHAT IS IT                                  |
|---------------------------------------------|
| Base of a <i>qingbai</i> -glazed molded box |
| CULTURE                                     |
| Chinese                                     |
| DATE                                        |
| A.D. 1162 to 1278                           |
| MATERIAL                                    |
| Ceramic                                     |
| FOUND                                       |
| Shipwreck, Java Sea, Indonesia              |
| DIMENSIONS                                  |
| Diameter 4.48 inches, height 2.12 inches    |







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| 14. Being a Greek Woman                | 39. Living under Norman Rule              |
| 15. Relaxing Greek Style               | 40. Being Medieval                        |
| 16. Being a Greek Refugee              | 41. Being Poor in the Middle Ages         |
| 17. Being a Sick or Disabled Greek     | 42. Being a Medieval Woman                |
| 18. Practicing Greek Religion          | 43. Being a Medieval Christian or Heretic |
| 19. Being an Old Greek                 | 44. Being a Medieval Knight               |
| 20. Being a Dead Greek                 | 45. Being a Crusader                      |
| 21. Being Persian                      | 46. Being a Pilgrim                       |
| 22. Living in Hellenistic Egypt        | 47. Relaxing Medieval Style               |
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